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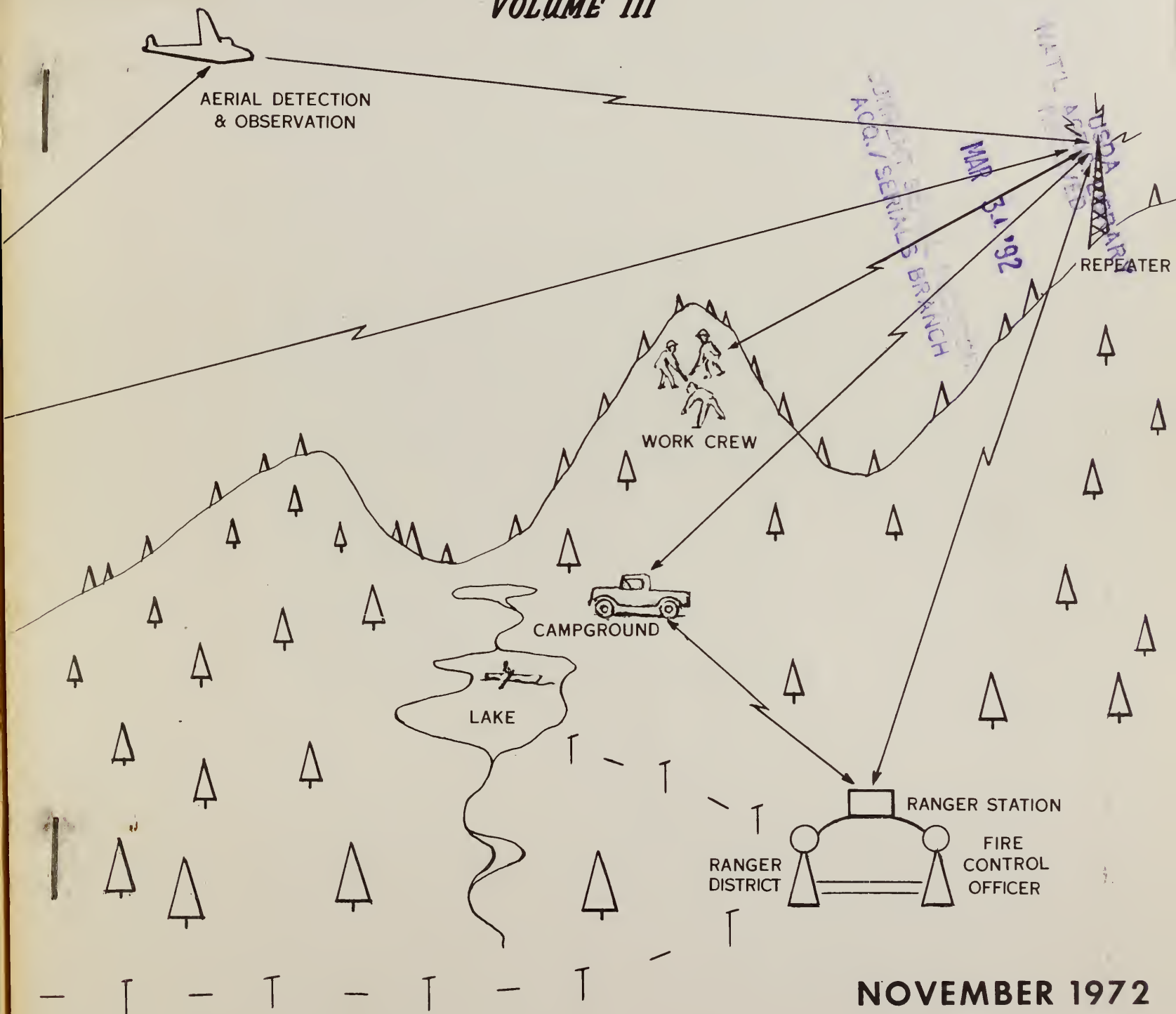
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Planning, Organization & Branching
**A STUDY OF
FOREST SERVICE**

TELECOMMUNICATIONS

VOLUME III



NOVEMBER 1972

**FOREST SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE**

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FOREST SERVICE TELECOMMUNICATIONS STUDY

VOLUME III

PLANNING, ORGANIZATION,
FINANCING AND MANAGEMENT

November 1972

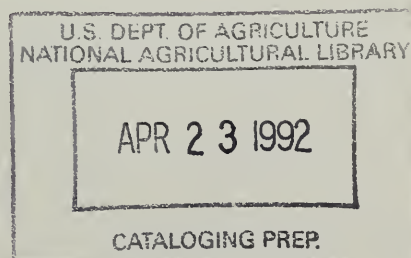


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SUMMARY OF FINDINGS

INTRODUCTION

As initially stated in Volume I, telecommunications in the Forest Service are considerably more vital and important than has been previously documented. The maintenance and procurement of field telecommunications should no longer be handled in conjunction with the administration of the long established Fire and General Improvements (old F&GP) P&M activity. The tangible and intangible payoffs are too obvious. Human safety, service to the public, increased administrative efficiency and effectiveness, law enforcement, employee morale, general convenience, and reduced resource losses from fire are all involved. Field telecommunications must receive additional management to fully capture these present known outputs, and to anticipate what field telecommunication systems the Forest Service should have to meet future demands. This section describes the various components that need to be considered in the development of telecommunications system management. The resulting system must allow the communications and electronics activity to compete for available financing as a separate and specific program.

Briefly, the system must provide both for the short term and long term planning, organizing, staffing, directing, coordination and budgeting of the Communications and Electronics activity.

The following sections discuss each phase in general and list specific recommendations. Details are covered in Parts II through V.

SUMMARY OF FINDINGS

Planning

Planning for the Forest Service telecommunications system must:

1. Inventory the needs by priority for field telecommunication links for:
 - a. The Ranger District and/or other field units.
 - b. The Forest Supervisor's Office.
 - c. Zone Fire Dispatching Offices.
 - d. Air-to-air and air-to-ground Regional operations.
 - e. Large fire situations.
 - f. Special and/or other purposes.

2. Consolidate the above into:

- a. Ranger District telecommunication inventories including alternative levels of service.
- b. National Forest telecommunications plans including alternative levels of service.
- c. Regional and/or Zone telecommunications plans including alternative levels of service.
- d. A Washington Office Service-wide system of cost estimates to support the various levels of field telecommunications summary including alternative levels of service.

3. Develop a paralleling Service-wide system of cost estimates to support the various levels of field telecommunications outlined above.

Organization and Staffing to Provide Direction and Control

Historically, the present Forest Service organizational hierarchy responsible for communications and electronics activities has developed somewhat like an orphan child. It has not been planned, but has evolved because of an accumulation of piece-meal actions. These actions have been in response to a series of demands for better communications as the on-the-ground management situation shifted, and as the state-of-the art of electronics and communications has been upgraded. Such an evolvement has not necessarily been wrong, but now the relative importance of field telecommunications has reached the point where it must be thoroughly examined and upgraded if necessary. Simply stated, intensive wild land management requires more and better communications than does protection and/or extensive wild land management. One of the major problem indicators may be an accumulative obsolescence in attempting to provide field telecommunications services under the same general type of budget line item and organizational pattern used in 1938 (33 years).

The Forest Service had 63,125 miles of Forest-Service owned telephone line in 1940. These lines were usable only part of the year and maintained by relatively cheap labor from the Civilian Conservation Corps, contributed labor from fire standby crews and limited support from P&M 110 (F&GP) maintenance funds. Today, (1971) it annually costs an estimated \$25 per mile to maintain a ground return tree line. If the Forest Service had 63,125 miles of tree line today, the estimated annual maintenance costs would be \$1,578,125 and the same limited field coverage would be available as in 1940.

(In F.Y. 1970, Regions 1-9 spent \$3,420,000 on maintenance of radio nets to get an average estimated 70 to 80 percent area coverage on a year round basis plus providing air-to-air and air-to-ground communications).

It is obvious why the changeover from many miles of Forest Service-owned telephone line to radios was initiated. Radio nets provide for better communications area coverage, give year round dependability, and make aerial operations possible. Radios do all of this now at equal or less cost per radio per month than a leased commercial telephone. In F.Y. 1970, the investment records show a total of 10,137 miles of Forest-Service owned telephone line. A limited number of miles will be needed indefinitely to back up the radio and other electronic nets.

As each field unit has replaced telephone lines with radios, it has become necessary to add an electronics technician for maintenance at the Forest level, and eventually, electronics engineers at the Regional and WO levels to provide technical direction. The resulting organization must now be examined in the light of how well it is designed to support the needs of the 1970's as outlined in "Framework for the Future."

The organization and staffing necessary to support the execution of the above planning effort cannot and should not be described in minute structured detail at all levels in this study. Because of the many variables involved, the field telecommunications organization must be a relatively simple structure that can be readily expanded or contracted according to the level of the planned field telecommunications approved by top management and subject, of course, to the dollars that the Chief annually assigns to the activity.

In the past, the Branch of Communications and Electronics in the Division of Administrative Management was not specifically assigned Service-wide responsibility for management of the field telecommunications activity. It provided technical support. The mission and role of the Branch has never been spelled out completely. In short, there has been no specific organizational entity at the WO level to develop and handle a management system that would allow fully justified field telecommunication needs to be consolidated at the Washington level. The field telecommunications activity has been included in the F&GP program. Field requests seldom progressed beyond the Regional level to the same extent available to other resource programs.

The mission of the field telecommunications activity can be defined within the framework of four separate and distinct roles:

1. The Department responsibilities delegated to the Forest Service by the Secretary wherein the Forest Service represents USDA and works with all other departments in the Government concerning radio and related communications frequency assignments.
2. The In-Service job of field telecommunications management.
3. Radiological monitoring for rural fire defense.
4. Advanced electronic applications consultation.

Adequate direction and coordination of the field telecommunications activity can only develop with management leadership. This leadership must start at the Washington Office level and pervade the entire field telecommunications organization. In the past, the importance of the USDA responsibilities have tended to greatly over shadow the need to provide internal field telecommunications management. In the opinion of the study team, the USDA responsibilities should be separated or at least described separately from the In-service telecommunications management job.

In addition, a look into the future indicates that communications of all types will play an increasingly stronger role in the management of all Forest Service activities. At some future point in time, the communication phases now scattered among several branches in the Divisions of Administrative Services, Administrative Management (ADP, C&E) and Engineering should probably be consolidated under one administrative unit to get effective and efficient coordination.

To substantiate these observations, part III contains detailed discussions as follows:

1. Interim organizational requirements for managing the communications and electronics activity.
2. Some comments on organizing the communication function to meet future requirements.

Financing

Part V contains a discussion of 7 financial alternatives for financing a field telecommunications Service-wide system. The study team recommends alternative No. 7 because we believe this method will fully identify justified financial needs to the Department, OMB, and Congress and place the need for large fire communications

in a special category for consideration by Congress. It should also have the best chance of supporting the recommended organization for the communications and electronics activity.

Management System

A communications and electronics management system must:

1. Be geared to and in tune with the short and long term objectives of the Forest Service
2. Include the complete spelling out and definition of the specific mission and role that a field telecommunications organization must perform
3. Take the field telecommunications planning, organizing, staffing, directing, coordinating and budgeting efforts and mold them into smoothly flowing annual and periodic processes to accomplish the described mission and role.

Part V graphically illustrates the closed cycle process that must be included in such a management system.

RECOMMENDATIONS

RECOMMENDATION NO. 1

PLANNING SHOULD BE ACCOMPLISHED IN TWO DISTINCT PHASES:

- a. MAJOR SYSTEMS REPLANNING PHASE COINCIDING WITH THE REPLACEMENT PERIOD FOR THE SYSTEM (FOR EXAMPLE, TEN TO TWELVE YEARS FOR THE FOREST SYSTEM).
- b. A YEARLY REVIEW PHASE TO AUGMENT AND MODIFY THE LONG RANGE PLANS AS NECESSARY.

RECOMMENDATION NO. 2

MAJOR SYSTEM REPLANNING SHOULD BE BASED ON:

- a. A REEVALUATION OF THE CONTRIBUTIONS OF THE EXISTING SYSTEM.
- b. EVALUATION OF REQUIREMENTS CONTAINED IN APPROVED FUNCTIONAL AND MULTI-FUNCTIONAL LONG RANGE PLANS.
- c. THE CONSIDERATION OF ALTERNATIVE WAYS OF SATISFYING REQUIREMENTS.

- d. INCORPORATION OF THE LATEST APPLICABLE AND FINANCIALLY FEASIBLE TECHNOLOGICAL DEVELOPMENTS.

RECOMMENDATION NO. 3

THE YEARLY REVIEW PHASE SHOULD BE DONE FOR A REGION-STATION-AREA AS A WHOLE USING FOREST AND/OR OTHER COMMUNICATION SYSTEM PLANS AND THE FUNCTIONAL WORK PLANS OF THE UNITS AS THE INPUT. IN THIS PLANNING PHASE, ONLY MODIFICATIONS AND ADDITIONS TO THE EXISTING SYSTEMS SHOULD BE EVALUATED FOR THEIR CONTRIBUTION TO THE FIELD TELECOMMUNICATIONS SYSTEM OBJECTIVES.

RECOMMENDATION NO. 4

THE BRANCH OF COMMUNICATIONS AND ELECTRONICS SHOULD CONTINUE TO OPERATE IN THE DIVISION OF ADMINISTRATIVE MANAGEMENT AT THE WASHINGTON LEVEL. PROGRAM RESPONSIBILITY AT THE REGION AND FOREST LEVELS SHOULD BE ASSIGNED TO THE ASSISTANT REGIONAL FORESTER FOR OPERATION AND THE FOREST ADMINISTRATIVE OFFICER RESPECTIVELY.

RECOMMENDATION NO. 5

DESIGNATE A COMMUNICATIONS MANAGER IN THE WASHINGTON OFFICE AND AT REGIONAL OFFICE. PROVIDE CAPABILITIES AT ALL LEVELS TO SATISFY THE MANAGEMENT RESPONSIBILITIES OF THE BRANCHES IN ACCORDANCE WITH THE MISSION AND ROLE STATEMENTS.

RECOMMENDATION NO. 6

STRENGTHEN THE ABILITY OF THE REGIONAL BRANCHES OF COMMUNICATIONS AND ELECTRONICS TO:

- a. ASSIST FOREST SUPERVISORS IN COMMUNICATIONS PLANNING, SYSTEM EVALUATION, MAINTENANCE, AND OPERATION.
- b. DESIGN INDIVIDUAL SYSTEMS, INCLUDING HARDWARE AND OPERATIONAL SPECIFICS.
- c. DEVELOP PROCEDURES FOR PLANNING, EVALUATION, DESIGN, MAINTENANCE AND OPERATION OF SYSTEMS.

RECOMMENDATION NO. 7

MODIFY THE EXISTING PROCEDURE BY SEPARATING THE P&M LINE ITEM FOR FIRE AND GENERAL PURPOSE (F&GP) IMPROVEMENTS INTO:

- a. MAINTENANCE OF FIRE AND GENERAL IMPROVEMENTS (STRUCTURAL).
- b. REPLACEMENT, AND MAINTENANCE OF RADIO AND/OR ELECTRONIC SYSTEMS.

BUILDINGS FOR COMMUNICATIONS, ANTENNA TOWER CONSTRUCTION, AND ADDITIONS TO ESTABLISHED COMMUNICATIONS SYSTEMS SHOULD BE RETAINED IN THE "NO-YEAR-END" CONSTRUCTION ITEM FOR FIRE ADMINISTRATION AND OTHER PURPOSES (FA&O).

RECOMMENDATION NO. 8

THE MISSION AND OBJECTIVES STATEMENTS, TOGETHER WITH THOSE RECOMMENDATIONS IN THIS ENTIRE REPORT (VOLUMES I THROUGH IV) APPROVED BY CHIEF AND STAFF, SHOULD BE INCORPORATED IN FOREST SERVICE DIRECTIVES TO SPECIFY THE PROPOSED MANAGEMENT SYSTEM. THE DIRECTIVES SHOULD CONTAIN THE FOLLOWING ELEMENTS:

- a. THE REQUIRED INFORMATION FLOW SHOULD ENCOURAGE FIELD MANAGERS TO MORE FULLY ANALYZE THEIR REQUIREMENTS.
- b. ELECTRONIC ENGINEERING SHOULD RESPOND WITH AN OPTIONAL TECHNICAL AND ECONOMIC DESIGN COORDINATED WITH ALL OTHER COMMUNICATION REQUIREMENTS FOR A MINIMUM COST.
- c. FIELD TELECOMMUNICATIONS MANAGEMENT SHOULD CAREFULLY BUDGET FOR THE NECESSARY FINANCING FOR THOSE COMMUNICATION ELEMENTS CONTRIBUTING MOST TO THE FOREST SERVICE MISSION.

PART II
PLANNING

PLANNING FOR FOREST SERVICE TELECOMMUNICATIONS

Planning should be accomplished in two distinct phases, as follows:

- A. Major systems replanning phase coinciding with the replacement period at ten to twelve year intervals.

Major systems replanning represents a heavy investment of time and money. It will be meaningful only if done when there is a reasonable chance for prompt implementation. The present three year planning cycle is now accomplished perfunctorily, if at all. It has done little for those forests that have aging systems but are not scheduled for replacement.

The planning objective will be to provide a modern field telecommunications system for the National Forests that will meet present needs and with minor modifications, adequately serve the forest until the end of the replacement cycle.

Circumstances may occur that will require more frequent replanning. Three examples of this are given below:

1. A system that needs major restructuring due to changes in the state of art.
2. Intolerable congestion levels.
3. Major shifts in geographical territory or changes in headquarters locations.

Major system replanning should be based on:

- a. A re-evaluation of the contributions of the existing system.
- b. Evaluation of communication requirements contained in approved functional and multi-functional long-range plans.
- c. The consideration of alternative ways of satisfying the requirements.
- d. Incorporation of the latest applicable technological developments.

This replanning should be done jointly by the user (Ranger and Supervisor in the case of the forest system) and the regional Communications Engineers. The review by the regional communications committee is no longer necessary.

Planning Responsibilities for Major Replanning of Communications Systems

District Ranger and/
or project leader
with communications
staff

Pinpoint problem areas.
List point to point and
point to mobile needs.
Estimate benefits by
functional areas.

Forest Supervisor
staff and communi-
cations engineer

Compile inventory of all
desired field telecommuni-
cation needs as expressed
in functional and multi-
functional long range
plans and submit requests,
estimate cost-benefits and
set priorities. Prepare
preliminary cost estimates,
develop alternatives. Pre-
pare forest field telecom-
munications plan.

Regional Forester
Branch of
Communication

Approve forest plan, select
alternative, complete design,
prepare final cost estimate
and include in a regional
plan for financing and
construction. Include costs
in regional budget to be
submitted to Washington
Office communication manager.

Chiefs Office
(Communications
Manager)

Prepare national summaries
and/or plans. Prepare equip-
ment specifications for the
replacement program. Prepare
justification statements for
B&F, OMB and budget hearings.

- B. A yearly review phase to augment and modify the long range plans as necessary.

This phase should be a regular part of the annual planning and budgeting job. The planner must determine the communication requirements to effectively carry out the program as expressed in the work plans. If his needs exceed what he has assigned, he must take steps to acquire the necessary equipment or modify his work plans.

The yearly review must look ahead more than just one year as obtaining equipment and installing it may take two or three years.

Necessary amendments to the plan are made as a result of the review. These should show acquisitions, deletions or modifications made during the year and describe new opportunities for future improvements. This review will also provide the information for updating items 91 to 99 of the project work inventory. Current P.W.I. data can serve both as a needs inventory and a bank of information for future planning in communications.

Evaluations are prepared only for the new additions to the system.

The yearly review phase should be done for the Region as a whole based on Forest or other communication system plans and the functional work plans of the units. Only proposed system modifications and additions should be evaluated for their contribution to the communication system objectives in this planning phase.

This review will require a consideration of communication needs as the functional work plans are developed and provide for orderly acquisition and implementation of the communication facilities. The yearly review will also permit timely responses to operational management decisions.

Planning Responsibilities for the Annual Review Phase

District ranger and/
or project leader
with communications
staff.

Incorporate communication
needs in project and recurrent
work plans. Recommend functional
or multifunctional responsibility.
Initiate cost-benefit evaluation
process.

Forest supervisor
staff and communi-
cations engineer

Review and approve communication
evaluations from ranger work
plans for communication aspects.
Prepare annual forest installa-
tion and maintenance work plan.
Prepare forest estimates of
equipment and costs for next
year's budget and advance
estimates as needed.

Regional Forester
(regional communications engineer)

Review forest requisition and budget and consolidate for the region. Consider priorities and available financial resources and prepare annual requisition to Washington Office for consolidated purchasing. Prepare five year budget estimates for submission to communication manager in Washington Office.

Washington Office
(communications manager)

Review and combine regional plans into national plans and/or summaries. Place consolidated order for equipment. Combine regional cost estimates into Service-wide summaries and prepare annual and five year budget estimates.

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PART III

ORGANIZATION

A. INTERIM REQUIREMENTS

B. FUTURE REQUIREMENTS

A. INTERIM REQUIREMENTS



INTERIM REQUIREMENTS

Mission of the Communications and Electronics Organization

The mission of the communications and electronics organization is to:

- Provide technical assistance in the planning and evaluation of alternative electronic systems (voice and non-voice) for data transmission and coordinate their uses.
- Design, implement, manage, maintain and improve non-commercial electronic data transmission systems.
- On request, consult on or prepare designs for other applications of electronic technology to aid Forest Service programs and evaluate such applications.
- Accomplish Department-wide and special departmentally delegated responsibilities.

The mission statement recognizes the increasing use of electronic data acquisition and transmission services by various functional branches of the Forest Service. The expected proliferation in communication requirement create the need for coordination and technical assistance in the selection of alternative modes of transmission service. The first item of the mission statement makes this an explicitly recognized function of the communications and electronics organization. The other items restate the traditional role of the Communications and Electronics Branch. In addition the second item stresses the management and design responsibilities of the organization for Forest Service operating systems.

Role of the Communications and Electronics Organization

The role of the organization, to accomplish the assigned mission, pertains to three areas:

- - - Electronic Data Transmission (EDT)
- - - Forest-Service Owned Electronic Data Transmission
- - - Departmental Responsibilities

Discussion of each follows:

Electronic Data Transmission (EDT)

This function is broken down into:

1. Establishment of Standards

This includes establishing standards for the procurement and use of electronic or other data transmission equipment required to support all Forest Service programs.

2. Equipment Applications

This includes consulting on electronic data transmission equipment and/or systems applications; development of exact requirements for such electronic equipment or system; developing "from scratch", or surveying the market and arranging for testing of likely equipment to meet requirements; writing specifications and giving technical guidance in the management of contracts; conducting a continuous products information search for all types of radio and electronic equipment which may have a capability of improving our overall EDT programs; searching out, through all functional divisions and the field, potential electronic applications, and other state-of-the-art developments which may improve the overall electronic communications program.

3. Equipment Evaluation

This is a continuous program which concerns EDT standards and equipment application, new techniques, modifications of systems and equipment, equipment performance, maintenance of a test and certification program to assure quality of equipment purchased, and with manufacturers in standardizing special equipment and operational characteristics to meet field requirements.

4. Information and Training

The communications and electronics organization is responsible to all units of the Forest Service for information and training concerning all electronic data transmission activities. This should be accomplished through periodic information releases, review of professional and technical meetings where new processes or equipment are displayed and discussed. This also includes on-the-ground training and leadership in the application of new techniques, procedures, equipment and ideas.

5. Consultation

Personnel may be made available for consultation and advice throughout the Forest Service, the Department, and other agencies for all activities within the purview of the advanced electronics application unit's mission, including followup training as required.

Forest-Service Owned Electronic Data Transmission (EDT)

EDT systems management must provide effective programs in three primary areas:

1. Service-wide EDT Management

This program should:

- a. Identify and inventory individual EDT needs, and stratify these needs by priority and type of equipment required to provide essential service.
- b. Consolidate these requirements into feasible alternative plans according to priority and anticipated future needs.
- c. Estimate the cost of implementing such plans at varied levels of priority.
- d. Consolidate district, Forest, zone and aircraft plans into regional plans along with realistic cost estimates for varied levels of implementation.
- e. Summarize all Region, Area, and Station plans into a Service-wide program, and develop realistic cost estimates for annual and projected maintenance, replacement, and construction requirements.
- f. Develop summary estimates for budget requests along with adequate and complete justification statements to back up requests. Participate in budgeting process to the point that communication needs are assured full consideration in the competition for available appropriated dollars.
- g. Recommend allocation of appropriated dollars to regions, areas and stations according to administrative requirements.

2. Forest Service Frequency Management

This program should:

- a. Determine the long-range requirements of the Forest Service for radio frequencies.
- b. Determine the specific number and distribution of radio frequencies presently needed.
- c. Procure the needed frequencies.
- d. Determine potential improvements in the "state-of-the-art" of electronics and management changes which will have an impact on future Forest Service frequency management requirements.

3. Organization and Administration

This is the day-to-day leadership and direction given to the management of Forest Service communications and electronics systems, excluding commercial and GSA-operated or controlled systems. This involves:

- a. Aiding in the inventory of the workload, skills, and manpower requirements to plan, construct, maintain and/or replace the various systems.
- b. Participation in the recruitment of electronic engineers and technicians with the necessary skills to accomplish the workload.
- c. Designing the organization by which engineers and technicians get the job done.
- d. Anticipating annual and multi-year planning requirements for men, money, and materials.
- e. Keeping management informed of the costs of the in-house EDT systems.
- f. Providing support service to the EDT program by providing specifications for radio communications equipment. Insuring that data developed in the test and certification program is adequate to assure quality of equipment purchased and disseminate test results as rapidly as developed.

- g. Establishing policy, standards and procedures, for EDT programs, excluding commercial and GSA operated or controlled systems.
- h. Establishing and maintaining methods, programs, and assistance in the area of technical training for technicians and engineers.
- i. Assist in establishing and maintaining career development opportunities for technicians and engineers.
- j. Establishing and maintaining an inspection and overall evaluation system to measure the effectiveness of the total communications and electronics program.
- k. Providing technical and management consultation service, as requested, such as EDT planning, methods, propagation programs, path reliability, systems, and training.

Departmental Responsibilities

1. Radio Frequency Management

The Department of Agriculture is one of eighteen member Federal agencies making up the Interdepartment Radio Advisory Committee (IRAC). This committee, working through the frequency management directorate of the Office of Telecommunications Policy, advises the President on all matters concerning the telecommunications program in the Federal Government.

The Interdepartment Radio Advisory Committee is the principal technical committee advisory to the Director of Telecommunications Policy (DTP). It uses the expertise of its members from the various agencies to advise the Director in planning, programming, coordinating, evaluating, review, study and analysis and problem-solving in all matters of radio frequency management, nationally and internationally. Some specific functions of the DTP in which this advisory capacity is utilized are to:

- a. Serve as the President's principal advisor or telecommunications.
- b. Develop national plans, policies and programs for telecommunications in the public interest.
- c. Coordinate national and international conferences and negotiations.

- d. Coordinate telecommunications activities, policies, and standards for the executive branch.
- e. Evaluate national telecommunications requirements and capabilities of existing systems to meet these requirements.
- f. Review research and development which leads to improved or expanded national telecommunications systems.
- g. Coordinate telecommunications planning for national emergencies.
- h. Develop, with the FCC, a long range plan for improved management of spectrum resources.
- i. Conduct studies and analysis as required and maintain a data base for spectrum management.

In redeeming responsibilities within this delegation, the Forest Service represents all bureaus in the Department concerning their radio engineering operations. At the present time the following USDA agencies are radio frequency users:

- . . . Forest Service
- . . . Agricultural Research Service
- . . . Soil Conservation Service
- . . . Federal Extension Service
- . . . Packers and Stockyard Administration
- . . . Agricultural Stabilization and Conservation Service
- . . . Plant and Operations
- . . . Office of the Secretary

The Department of Agriculture ranks seventh of all Government agencies in the number of frequency assignments, with the Forest Service accounting for 95 percent of these.

In addition to the work of the main committee, some of the functions of the Interdepartment Radio Advisory Committee are carried out by subcommittees such as the Frequency Assignment Subcommittee (FAS), Technical Subcommittee (TSC), Spectrum Planning Subcommittee (SPS), International Notification Group (ING); and temporary ad hoc working groups as needed. The Forest Service has been delegated the responsibility of representing the entire Department of Agriculture on the Interdepartment Radio Advisory Committee and its subcommittees.

2. Radiological Defense

Secretary's Memorandum 1489 of February 1, 1962, defines Forest Service responsibility for radiological defense activities as:

- a. Radiological monitoring of forest land and water in emergencies and for rural fire defense.
- b. Insuring continuity for operation, protection and maximum use of facilities, personnel, and resources in event of attack or other disaster.

To meet nuclear radiation emergencies involves three procedural approaches by the Forest Service:

- a. Personnel safety and protection.
- b. Land or area monitoring where operational projects are conducted.
- c. Product or material monitoring as required for safety in project work.

Of the three above listed, personnel safety and protection has first priority.

The communications and electronics organization has been delegated the responsibility for the administration of the Forest Service Radiological Defense activities at the National level. This responsibility is concerned with:

- a. Training programs
 - b. Equipment programs
 - c. Program reviews
 - d. Reporting
 - e. Advising Chief and Staff in defense activities
3. Electromagnetic Radiation Management Advisory Council (ERMAC).

Personnel from the communications and electronics organization are selected by the Secretary of Agriculture to serve as technical advisors to this council in matters relating to control of the electromagnetic environment, such as evaluation of biological effects of non-ionizing radiation.

Development of Organizational Alternatives for
Communications and Electronics Program Management

General

The tasks of the communications and electronics management group are to develop, administer, evaluate, and modify systems to meet the objectives as described in the preceding mission and role statements. To be effective, this management group must hold as its own the objectives of the Forest Service and the resulting objectives of the communications and electronics activities. The group must be knowledgeable in three areas:

1. The area of technical electronic communications engineering, application techniques, planning, etc.
2. The area of Forest Service program activities, the environment, and the character of the Forest Service organization.
3. The area of management competence and leadership skills.

Presently, there are studies in progress evaluating alternative basic Forest Service organizations, particularly at the Regional and National Forest levels. The fundamental difference between these organizations and the traditional Forest Service organization is a defunctionalization of the management processes, along

with a strengthening of interdisciplinary planning, programming, and accomplishment activities. It does appear, however, throughout most of these proposals that certain service and support groups will be left intact. It is not envisioned that communications and electronics knowledge and skills will be fractured at the National, Regional, or Forest level. Therefore for the ease of consideration alternatives of organization are presented within the existing traditional structure. However, if any alternative is particularly adapted to, or conversely not consistent with, contemporary organizational proposals, these considerations will be noted.

In developing alternatives in this section, the discussion is divided into three parts:

First, the assigned responsibilities for the various levels of the Forest Service are presented. These responsibilities show the relationships between Washington Office, the Regional Office, and the Forest Supervisor's Office in the conduct of the communications and electronics program.

Second, organization alternatives for assigning the program authority and responsibility for communications and electronics are developed and considered. In other words, where within the Forest Service could or should the responsibility be placed?

Third, organizational possibilities for the technical execution of the program are developed and considered. This answers the question of who should support electronic data transmission systems and provide technical electronic and communications assistance to Forest Service program managers.

Responsibilities of the Communications and Electronic Organization to the Various Levels of the Forest Service

As outlined in the preceding description of the role of the communications and electronics organization, the following responsibilities apply to all levels of the organization:

- - - Electronic data transmission
- - - Forest-Service owned EDT Systems
- - - Departmental responsibilities

Washington Office Responsibility

The responsibility of the communications and electronics organization should be defined to support the Chief's responsibilities for national policy and program formalization plus special departmental delegations, and include the following elements:

- - - Formulate, operate and evaluate management systems for the administration of a national program of communications and electronics activities.
- - - Provide leadership for the direction of communications and electronics activities in the Washington Office and field locations.
- - - Provide staff assistance to Chief and Staff.
- - - Provide the liaison with Department and other public and private agencies.

Regional Office Responsibility

The responsibility of the communications and electronics organization should be defined to support the general responsibilities of the Regional Forester's Staff and consist of:

- a. Providing staff assistance to the Regional Forester and staff in the administration of Service-wide communications and electronics policies, and their application to the national forests within the region.
- b. Developing regional standards, methods, and techniques to be used in achieving national forest administration objectives through communications and electronics.
- c. Training national forest personnel in the meaning of standards and the use of techniques and methods.
- d. Assisting the national forest personnel in the meaning of standards and the use of techniques and methods.
- e. Providing some centralized services when warranted.
- f. Reviewing the results of communications and electronics applications on the ground, and providing proper actions toward correcting them, when needed.

National Forest Responsibility

The role of communications and electronics organization should be defined to support the Forest Supervisor who has the general responsibilities for:

- a. Basic planning for:
 - Resource protection, development, and management.
 - Activities related to above.
- b. Program implementation and accomplishment.
- c. Training and consulting district rangers in standards, techniques, and methods.
- d. Providing some centralized services when warranted.
- e. Reviewing results of actions on the ground and correcting, when needed.

Organizational Alternatives for Program Management

Alternative No. 1 -- This alternative would make no changes in the present organizational structure. (Chart 1) Within this structure, program responsibilities at the Washington Office rest with the Division of Administrative Management, under the Deputy Chief for Administration. The Branch of Communications and Electronics has the technical and management responsibilities. The Branch of Organization and Programs has the responsibility for administering the Fire and General Purpose Improvements program from which the communications budget is formulated and allocated.

At the regional level, program responsibility usually rests with either the Chief of the Division of Operation or the Regional Engineer and the Regional Communications Committee.

Coordination and direction are developed and provided through a committee of representatives consisting generally of Operation, Fire Control, and Engineering. The Regional Electronics Engineer, who is responsible for accomplishment, is either responsible to the Chief of the Division of Operation or the Regional Engineer.

At the National Forest level a staff officer is assigned the Forest communications responsibility and the Forest technician is generally assigned to the Forest engineer or the Forest fire control officer.

Chart 2 illustrates all of the organization units that have an input into the activity, and the chart is difficult to understand. However, it accurately reflects the existing situation. Many people have inputs into the system, but no one individual or unit is specifically charged with the overall sponsoring and/or management leadership for the activity.

Advantages -- Alternative No. 1

1. All related electronics and communications activities at the Washington Office level are under the Deputy Chief for Administration.
2. Program management and execution is highly decentralized to the Region and Forest levels.
3. This organization and the resulting processes are now in existence.

Disadvantages -- Alternative No. 1

1. In the Washington Office the responsibilities for program input are fragmented between the Divisions of Administrative Management and Fire Control and Deputy Chief areas.
2. No one individual monitors or has the responsibility for all the technical, managerial, and budgetary aspects of the program at the Washington Office.
3. At the Regional level, responsibility is also fragmented and management is by committee.
4. There is a lack of vertical organizational continuity from the Washington Office to the Regional Office to the National Forest.
5. There is a lack of program coordination between electronic users at all levels.
6. There is no specific assignment of the electronics and communications program management at the Washington Office.
7. There are no Service-wide bases or systems upon which to rely to help make consistent decisions between regions.
8. Financial resources are out of balance with planned field needs.

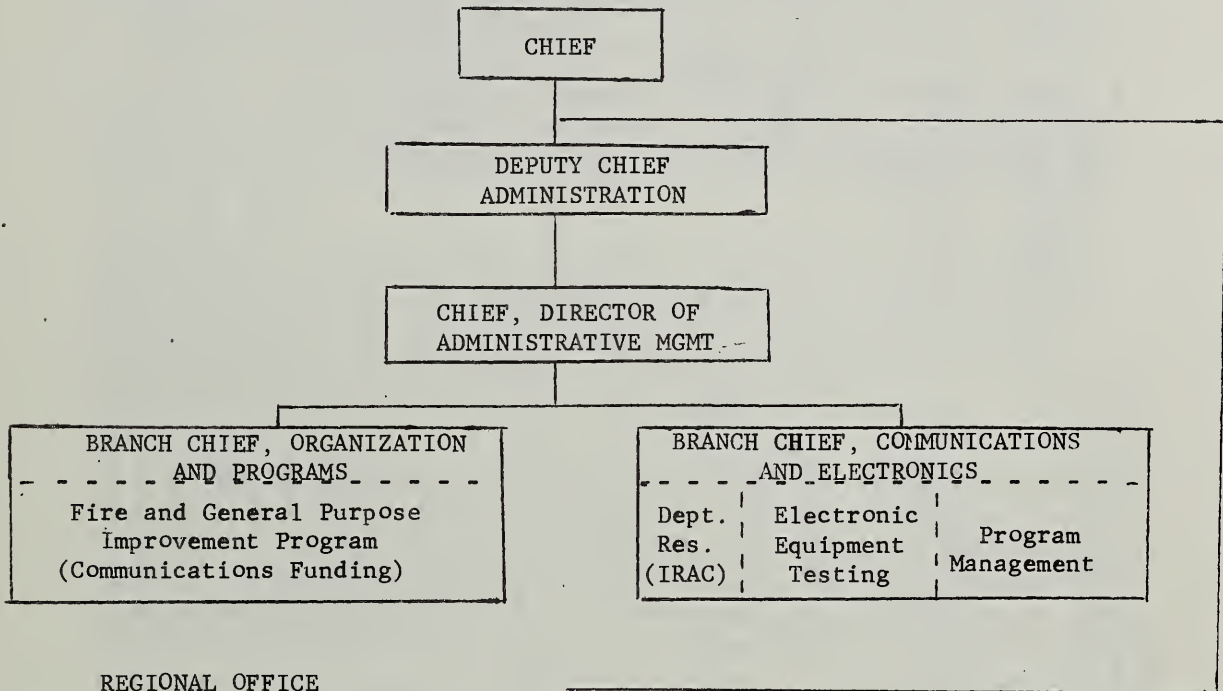
CHART 1

SERVICE-WIDE ELECTRONIC USES AND
FIELD TELECOMMUNICATIONS ORGANIZATION

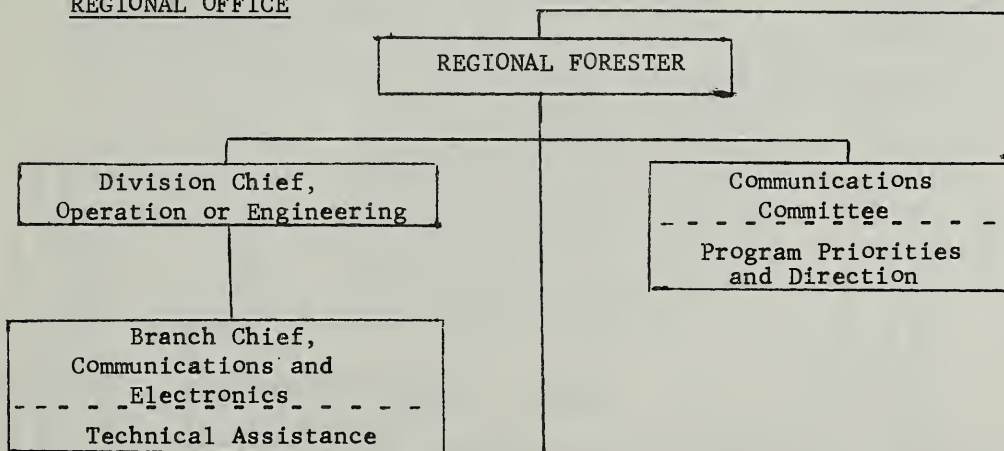
Alternate No. 1

(Existing)

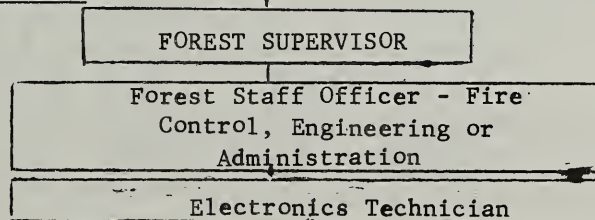
WASHINGTON OFFICE



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EXISTING FIELD TELECOMMUNICATIONS ORGANIZATIONAL PATTERN

LEGEND

Line Direction and Flow of Management Information
 Staff Direction and Flow of Management Information
 Technical Direction and Flow of Technical Information

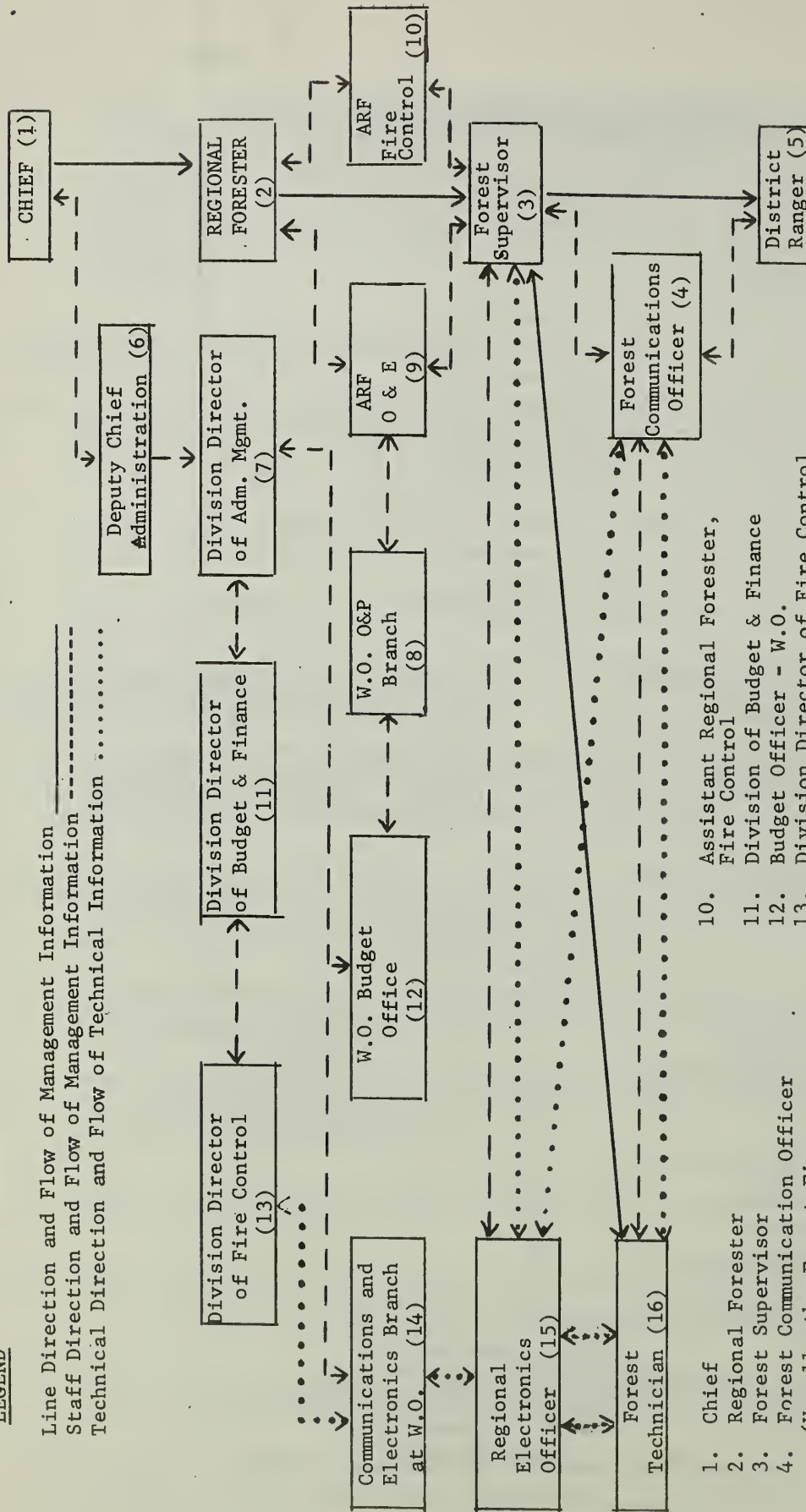


CHART 2

This chart illustrates alternative 1 which is to make no changes and to continue to operate with existing org. pattern.

9. Line, staff, and technical field managers are dissatisfied with the existing processes. This dissatisfaction generated this Service-wide study which is designed to recommend alternative actions.
10. The existing processes do not permit the field telecommunications activity to fully compete for available financing at the Chief and Staff level.
11. There is no Service-wide management process, or closed/loop feedback, to give annual consideration to the planning, organizing, staffing, directing, coordinating, and budgeting of the program.
12. The existing organization allows relatively little management information to be exchanged between the field and the present Washington Office Electronics and Communications Branch. Technical information is being provided to a greater, yet inadequately coordinated, extent.

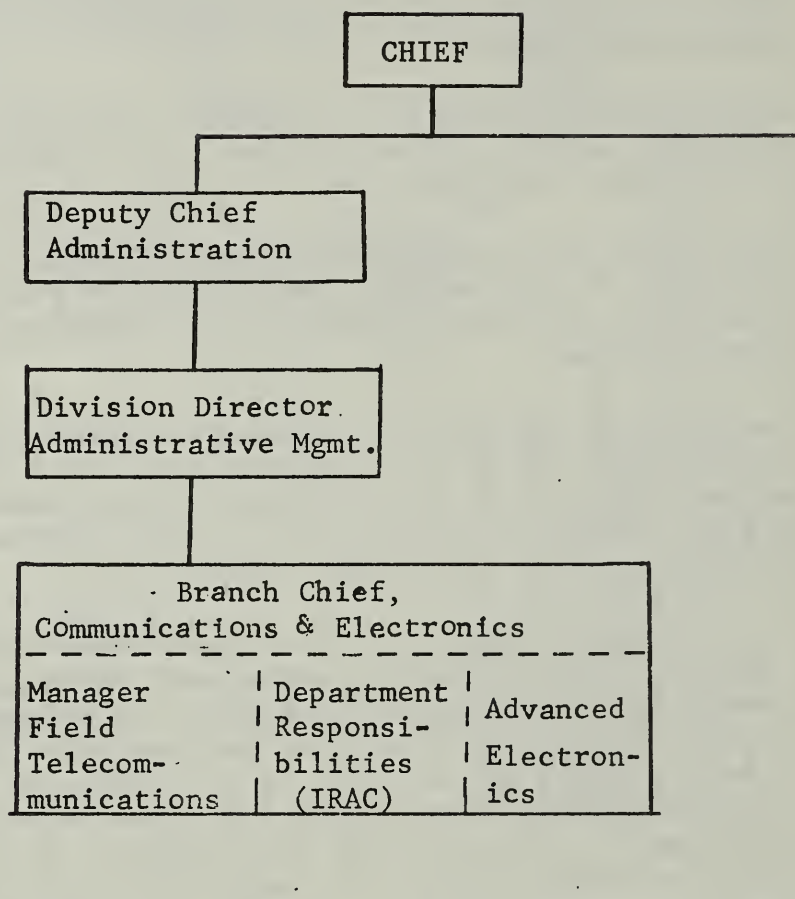
Alternative No. 2 -- This organization (Chart 3) would retain U.S.D.A. frequency management (IRAC), communications management, and advanced electronics development within the Branch of Communications and Electronics in the Division of Administrative Management. In addition, the development of program funding requests would be transferred to it from the Branch of Organization and Programs. A field telecommunications manager would be designated in the branch who would be responsible for overall program coordination at the Washington Office for Forest Service-owned telecommunications systems. Program responsibility at the Regional level would be assigned to the staff function closely related to the Division of Administrative Management which would be the Assistant Regional Forester for Operation. At the National Forest level, program responsibility would rest with the Administrative Officer.

Advantages -- Alternative No. 2

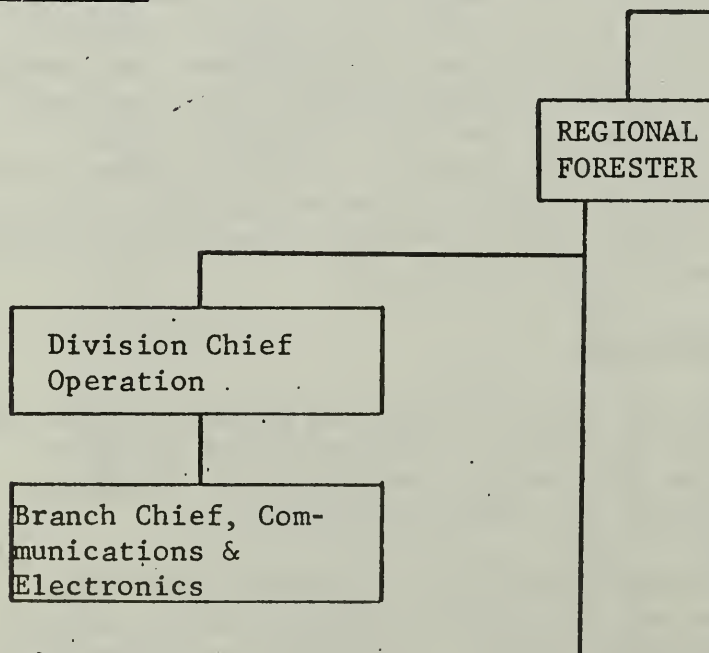
1. The responsibility for administering the communications and electronics program with the Washington Office would be retained within the Division of Administrative Management under the Deputy Chief for Administration.
2. The specific responsibilities for managing Service-wide communications and electronics activities would be centered in one Washington Office branch - the Branch of Communications and Electronics.

Alternative No. 2
(Proposed)

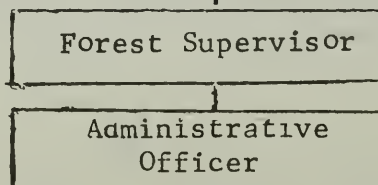
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3. Staff responsibilities would be consistent through all levels. (Washington Office, Regional Office, National Forest) through assignment of activity to the administrative management staff.
4. Fewer organizational units at the Washington Office would be involved, since communications activities would be removed from the Organization and Programs Branch and placed in the Communications and Electronics Branch.
5. At the regional office, the total program responsibility would rest in the Division of Operation and the communications committee could be eliminated.
6. The responsibility for program management and program execution would be standardized for all regions. This would also be true at the National Forest level where program responsibility would rest with administrative officer.
7. Future requirements in other segments of the data transmission field, such as EDP TWX, etc., may dictate a need to pull these elements together. This Deputy Area and Division may be the most suitable location to serve all the Forest Service.

Disadvantages -- Alternative No. 2

1. The administration of the communications and electronics program may tend to be more centralized at the Regional Office and National Forest level, since total responsibility would rest in the Division of Operation and with the Forest administrative officer.
2. In the Washington Office, the Branch of Communications and Electronics would retain two major yet not particularly related responsibilities-IRAC and program management-and thus there may be a tendency to place less emphasis on program management than is desirable.
3. The administrative officer position at the National Forest level could be weak in the expertise required to support and implement communication activities. His support of technical people involved in the system operation could be less than needed.

4. Should the assignment of the electronics technician be made to the forest administrative officer, there could develop a supervisory split between administrative and technical direction involving the administrative officer and the electronics engineer at the regional level.

Alternative No. 3 -- This alternative (Chart 4), would retain all the communications and electronic activities under the Deputy Chief for Administration, within the Division of Administrative Management. It would separate USDA frequency management (IRAC) from communications and electronics management, and would place it in a branch reporting directly to the Director of the Division of Administrative Management. Responsibility for communications and electronics management and development would be retained within the present branch. A field communications manager would be designated within the branch. This branch would have the responsibility for planning, justifying, and formulating budgetary requests for the program to Chief and Staff and to the Division of Budget and Finance through the Director of Administrative Management.

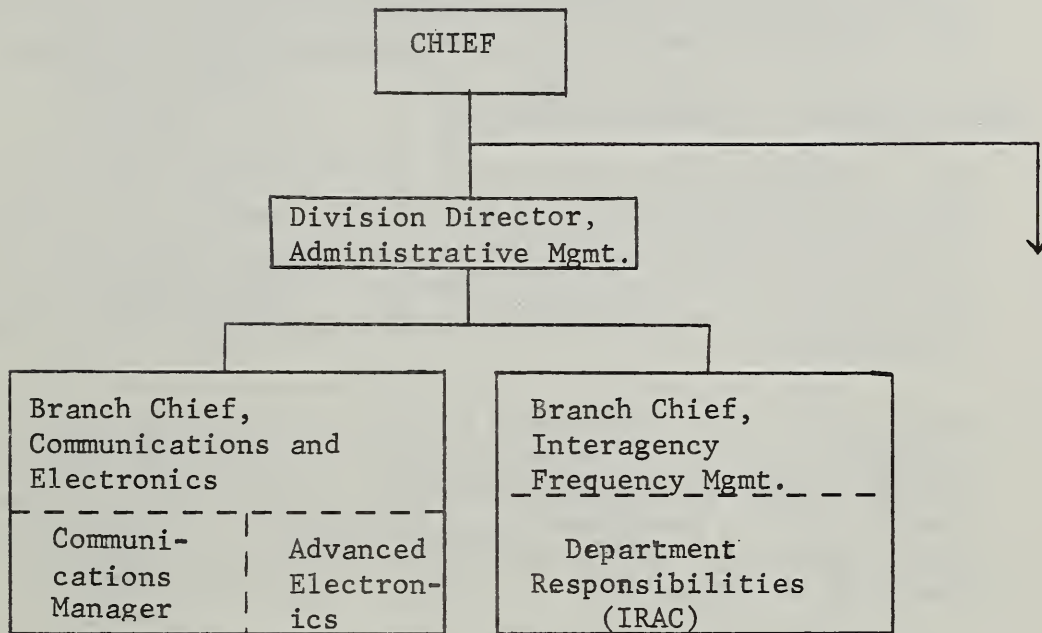
As in Alternative No. 2, the communications and electronics activity would be assigned to the Assistant Regional Forester for Operation, and additional technical expertise would be provided to him as workload requires. The communications and electronics responsibility at the National Forest level would, like Alternative No. 2, be assigned through the Forest Administrative Officer to the electronics technician.

Advantages -- Alternative No. 3

1. Service-wide communications and electronics program management would be the responsibility of the Branch of Communications and Electronics in the Washington Office with increased expertise and emphasis, all under the Deputy Chief for Administration and within the Division of Administrative Management.
2. An additional branch within the Division of Administrative Management would be developed and would assume responsibilities for IRAC, with resulting increased expertise and emphasis for this program.
3. There would be functional continuity throughout all organizational levels through the administrative management function.

Alternative No. 3

(Proposed)

Regional Office and Supervisor's Office

Same as for Alternative No. 2

4. The responsibilities for program administration and planning to support financial needs would be in the same branches (Administrative Management), in both the Regional Office and the Washington Office.
5. Should governmental reorganization occur, the IRAC responsibility could be separated out without disturbing Forest Service communications and electronics management activities.

Disadvantages -- Alternative No. 3

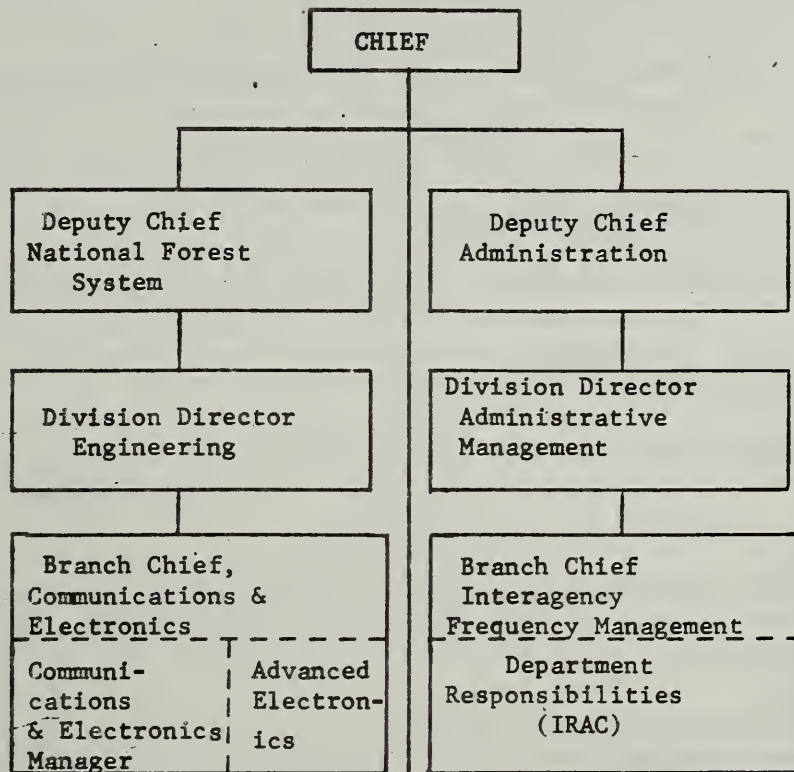
1. This organizational pattern may tend to create some undesirable centralization and control of the communications and electronics activity both in the Washington Office and the Regional Offices, due to collection of responsibilities in the Branch of Communications and Electronics in the Division of Operation.
2. Could create a split between administrative activities and technical support activities. This is due to the responsibility for technical administration resting with the administrative officer at the national forest and technical guidance to the technician is the responsibility of the Regional Electronics Engineer.
3. It may tend to weaken the Forest Service frequency assignment program if the IRAC activities were split from Forest Service management activities. The Forest Service may lose an important link with IRAC if governmental reorganization should occur.

Alternative No. 4 -- This alternative (Chart 5) would separate USDA frequency management (IRAC) from the Service-wide communications and electronics program administration activities. The IRAC management activities would be maintained within the Division of Administrative Management under the Deputy Chief for Administration. The communications and electronics activity would be removed from the Division of Administrative Management and placed in the Division of Engineering under the Deputy Chief for National Forest System.

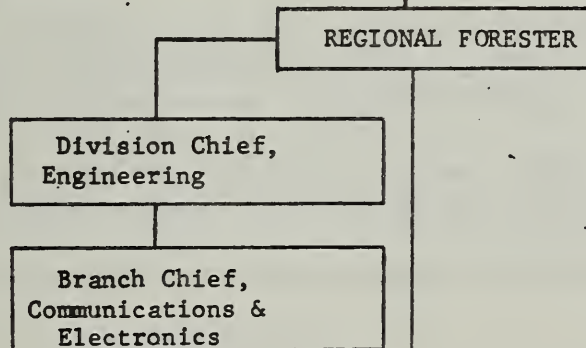
A communications and electronics manager would be designated within the new Branch of Communications and Electronics. This branch would have the responsibility for planning and justifying the program through the Director of the Division of Engineering to Chief and Staff and providing supporting material to the Budget and Finance Division.

Alternative No. 4
(Proposed)

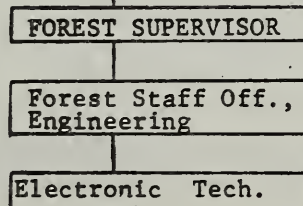
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At the Regional Office the communications and electronics activities would be assigned to the Regional Engineer. This branch would be provided with additional technical expertise as the workload requires.

At the National Forest level the communications and electronics responsibilities would be assigned to the Forest Engineer, who would direct the electronics technician.

Advantages -- Alternative No. 4

1. The unrelated portions of IRAC responsibilities and electronics and communications responsibilities would be separated. The separate requirements would not directly compete for manpower and money.
2. All responsibilities for Service-wide communications and electronics activities would rest in a single branch within the Division of Engineering.
3. Functional continuity would be developed through all levels as a defined responsibility of the engineering organization.
4. The IRAC responsibility could be shifted without major impact on communications and electronics activities should governmental reorganization occur.
5. The administration of this program under the Deputy Chief for National Forest System may allow the activity to better compete with other resource programs for available dollars.
6. Communications and electronics activities are of an engineering type of discipline and have engineering identity.
7. There would be a standard organizational pattern throughout the regions.
8. In the field, communications and electronics activities may receive additional support simply because they would be associated with a larger on-going program that is better financed and staffed (Forest Service Engineering).
9. The engineering function is technologically oriented and progressive in seeking out and adopting new methodologies.

Disadvantages -- Alternative No. 4

1. The assignment of the communications and electronics functions under the Deputy Chief for National Forest System may subordinate the needs for State and Private Forestry and Forest Research.
2. The IRAC responsibility and the Service-wide management of communications and electronics, including frequency management, are separated between the Deputy areas for National Forest System and Administration. This may tend to weaken our frequency management program.
3. The existing communications and electronics organization is small compared to the total engineering organization, and could be subordinated to the point that program support would deteriorate.
4. Communications and electronics program responsibility under the Deputy Chief for National Forest System may tend to widen the gap between Service-wide radio telecommunications systems and the other segments of the data transmission field such as EDP, TWX, etc. Future requirements may dictate a need to pull all elements of data transmission together and this organization could tend to increase the difficulty.

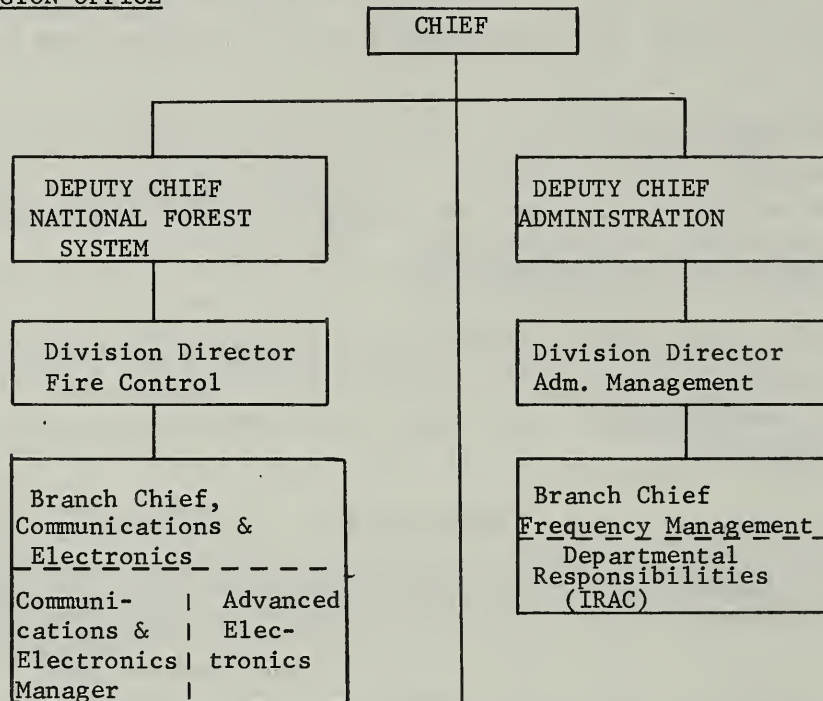
Alternative No. 5 -- This alternative (Chart 6) is similar to alternative number 4 except that the communications and electronics program management responsibility would be assigned to the Division of Fire Control rather than the Division of Engineering in the Washington Office. The activity would be assigned at the regional level to the Assistant Regional Forester for Fire Control and at the National Forest level to the Fire Control Officer.

Advantages -- Alternative No. 5

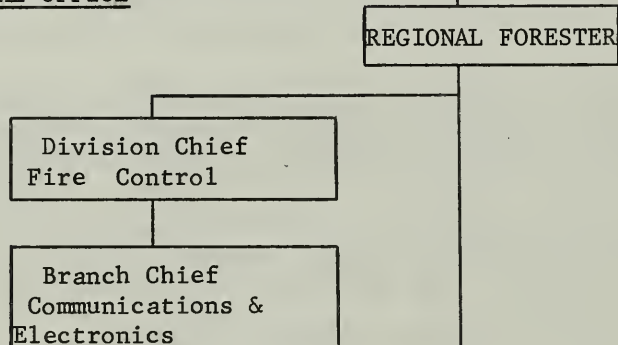
1. Communications and electronics program responsibilities and IRAC responsibilities would be separated within the Washington Office, with the former being assigned to Division of Fire Control within the Deputy Area for National Forest System and the latter in the Division of Administrative Management under the Deputy Chief for Administration.
2. Program support in financing for large communications would probably be increased.

Alternative No. 5
(Proposed)

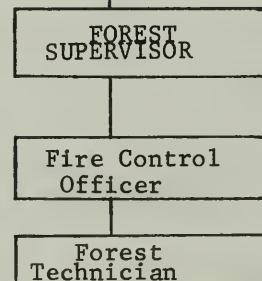
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Disadvantages -- Alternative No. 5

1. Communications and electronics needs for State and Private Forestry and Forest Research may be subordinated if the activity is assigned to the Deputy Chief for National Forest System.
2. Technical support would probably be weaker for other functions than it would be if it were in the engineering organization. Program support may have too much emphasis on fire communications and relatively less for other Forest administrative needs.
3. The electronics engineering discipline does not identify as well with fire activities and it is not as compatible with them as it would be with other engineering functions.

Conclusions and Recommendations for Communications and Electronics Program Management

The management of Forest Service owned Electronic Data Transmission (EDT) System, especially radio, is the major task of the communications and electronics organization. This will likely be true for sometime. The activity extends across all functions and all administrative units of the Forest Service, including State and Private Forestry and Forest Research. The activity will become increasingly more inter-related with other EDT systems, such as EDP and TWX. Long-range considerations, therefore, indicate the management of this activity should not be shifted as discussed in alternative numbers 4 and 5, but stay in Administrative Management.

Communications management and frequency management are integrated to a degree that the establishment of separate branches may create more coordination problems than can be offset by the possible advantages of specialization outlined in Alternative Number 3.

This entire study documents the significant payoff in both efficiency and effectiveness that good field communications can give to the Forest Service. To fully capture these benefits will require an increasing emphasis on (1) the recognition, and (2) the management of the communications and electronics activity. The designation of Washington and Regional Office communication managers with this assigned responsibility is, perhaps, the most beneficial organizational change that is possible at this time.

Consequently, the study team believes Alternative Number 2 is the best option and suggests this direction be followed in developing management responsibility. In order to develop a strong Service-wide communications and electronics program, the following is recommended:

RECOMMENDATIONS

RECOMMENDATION NO. 4

THE BRANCH OF COMMUNICATIONS AND ELECTRONICS SHOULD CONTINUE TO OPERATE IN THE DIVISION OF ADMINISTRATIVE MANAGEMENT AT THE WASHINGTON LEVEL. PROGRAM RESPONSIBILITY AT THE REGION AND FOREST LEVELS SHOULD BE ASSIGNED TO THE ASSISTANT REGIONAL FORESTER FOR OPERATION AND THE FOREST ADMINISTRATIVE OFFICER RESPECTIVELY.

RECOMMENDATION NO. 5

DESIGNATE A COMMUNICATIONS MANAGER AT THE WASHINGTON OFFICE AND AT EACH REGIONAL OFFICE. PROVIDE CAPABILITIES AT ALL LEVELS TO SATISFY THE MANAGEMENT RESPONSIBILITIES OF THE BRANCHES IN ACCORDANCE WITH THE MISSION AND ROLE STATEMENTS.

Organizing for Program Execution

Tasks within Program Execution

General -- In the sections on roles and responsibilities several areas of task accomplishment were defined. These include such items as Departmental responsibilities, electronic data transmission technology, and Forest-Service owned electronic data transmission systems development and operation.

The major volume of work in the Forest Service, today and in the foreseeable future, is the area of mobile radio communication system development and operation. In reference to this area of work, the existing field organization has done remarkably well. Our forest technicians have been expected to be jacks-of-all-trades and experts in all, including system planning, design, and operation. They have constructed and maintained literally hundreds of systems--systems which warrant no apologies. A meager force of engineers has worked with the technicians within financial constraints which preclude consideration of really viable alternatives and have had demands made on their time for assistance in a multitude of areas other than field communications.

Historically the Forest Service mobile radio systems have been examples for others to follow. This has been accomplished, in a large part, because of the dedication and tenure of the engineers and technicians. They possess an understanding and feel for on-the-ground programs which only can be gained through long experience and complete familiarity with the systems they have developed and seen involve. This actually is ideal as long as the program does not become too large and its implications on other activities too great for an individual to monitor and manage. The increasing complexities and interdependence of resource management and related activities, plus our efforts to provide quality management has put a high demand on our ability to rapidly provide professional actions throughout the service. Professional quality service is sought from all, and the electronic communication organization is no exception.

This concern raises the question of increasing communications and electronics professionalism at the Forest level. Can an electronics technician continue to handle the job or will increasing engineering support be required?

Sections of this study concerning planning, requirement determinations, system evaluation, and system maintenance, indicate that the forest telecommunications job is becoming more professional in nature and a transition from predominately technical system maintenance to a more professional program management job must be anticipated.

Data Transmission Technology -- New opportunities for the application of electronic technology are increasing. These opportunities can allow field personnel to more efficiently and effectively meet Forest Service objectives. To capture these opportunities, expertise in the area must first be provided to line and program managers. Electronic knowledge and skills are also required in the management of certain Forest Service programs, such as special-use administration, environmental data telemetry, electric installations, etc.

The Ranger District is where the majority of point-to-point data transmission requirements must be evaluated, and initial cost/benefits first estimated. This is primarily the responsibility of the District Ranger. However, technical electronic knowledge can be best furnished from higher levels. Consequently, there appears to be no significant and specific need for electronic engineering or technical responsibility delegations to the Ranger. He must, however, have assistance either directly or indirectly so he can perform his role of identifying and documenting meaningful data transmission requirements.

This is a time of new and expanding technology. Potential users must be supported by the communications and electronics staff in understanding new developing techniques, training and assisting in new applications, and evaluating existing applications.

Forest-Service Owned Data Transmission Systems Program Development -- The accomplishment of many Forest program objectives depends upon the satisfaction of certain communication requirements. The contribution of Forest Service data transmission systems toward the meeting of these program objectives must be the most effective within limitations of state-of-the-art, financing, and available manpower and skills.

The Forest Supervisor and his staff must be provided with an awareness of the above limitations and opportunities as they affect program planning. This is a current and continuing responsibility of the communications and electronics staff.

As Forest program plans are considered and developed, telecommunication requirements become important considerations. Infeasible

telecommunication requirements can affect a desired program to the extent that program objectives, direction, and resulting plans must be modified accordingly. A high degree of technical knowledge is required so timely and accurate technical consultation can be presented to program planners, resulting in minimal mis-direction or lost effort.

Accurate and active participation in Forest program planning development will result in:

1. Forest programs fully utilizing telecommunication benefits.
2. A telecommunication program which is fully coordinated with Forest program objectives.

This resulting telecommunication program will be reflected in processes for telecommunication requirements determination and the criteria for evaluating them, standards of system planning, and various other guidelines, procedures, and methods describing the conduct of the electronics and communications activities.

System Characteristics Planning -- Within the framework of the Forest communications and electronics program, this area of work is concerned with the determination of specific data transmission system requirements which will result in system characteristics documentation and design. It consists of the following responsibilities:

- - - Counsel and assist Forest program managers in recognizing and describing communication needs arising from program activities.
- - - Describe telecommunication needs in terms of desired system characteristics, such as purpose, reliability, operating characteristics, capacity, etc.
- - - Analyze these system characteristics with respect to feasibility for application. Determine the applicable constraints and opportunities. If system is infeasible, partially or wholly, provide feedback to affected manager.
- - - Prepare realistic cost estimates.
- - - Counsel and assist in modifying manager's program activity in light of communications and electronics implications.

- - - Develop resulting communications and electronics system requirements, and plan the system. This system plan will be the basis for the design of the system's specifications.

System Specifications Design -- This category of work concerns the engineering of hardware and operation for Forest and District systems, which will meet the developed requirements for these systems. This will result in system specifications which define components of networks and operation, and allow the procurement, installation, operation and maintenance of such systems to be initiated. This responsibility includes:

- - - From the developed system characteristics plan, engineer alternative communications and electronics system specifications, considering such items as area coverage, propagation, availability of equipment, state-of-the art, financing, etc.
- - - Evaluate and make recommendations on the alternative system designs considering such items as economics, logistics, expansion opportunities, personnel, obsolescence, etc.
- - - Draft the selected system specification including specific components within the network and methods of operation of the system.

Systems Operation -- This category of work concerns the operation of communications and electronics systems. It includes the procurement, installation, maintenance, and replacement of the hardware components, and the user disciplines in using the system. This responsibility includes:

- - - Assist in procuring the hardware as specified in the system's specifications.
- - - Install the telecommunications system components.
- - - Maintain the components of the system.
- - - Replace system components.
- - - Train the operators of the system in proper operation of the system, including discipline and propriety of use.
- - - Consulting with the users to determine more advantageous telecommunications.

- - - Assist in evaluating the system and its operation in the light of providing satisfactory information exchange.

Departmental Responsibilities -- Within policies, as defined by the Department, the Chief, the Regional Forester, and the Forest Supervisor the Communications and Electronics Staff participates in implementing programs which will provide for personnel safety and protection, plus radiological monitoring to meet nuclear radiation emergencies.

Organization Alternatives for Program
Execution at Regional and Forest Levels

Prior to discussion of structural alternatives some discussion of the existing forest technician group's composition and makeup is warranted. Exhibit A in the appendices is a standard job description for Electronics Technicians, GS-856-11, and in general is quite representative of most regions for technicians at this level. Responsibilities within this job include those of planning, consulting, designing, maintaining, and operating Forest Service radio systems, almost in their entirety. The responsibilities shown are both managerial and technical in nature. The concept of providing for these skills at the system level has been valid, we believe, and we do not propose to change this concept. However, it is believed that the execution of these responsibilities will indeed require increasing levels of electronics and communications engineering skills. Any organizational modification should enhance the contribution of these skills at the system level.

It is difficult for managers of forest electronic technicians to develop workload hours for guidance in technician staffing. Standardization of workloads according to volume of business items, such as numbers and kinds of radios, is extremely difficult because of the varying, diverse factors affecting different national forest radio systems. However, technician workload hours have been established internally by various regions for their guidance in technician staffing. Exhibit B in the appendices shows guidelines "for figuring forest electronic technicians workload" as determined by one region. It includes hour standards for various types of equipment maintenance and installations, and lists other jobs pertinent to the electronic technician's skills. These include recordkeeping, reporting, work planning, operator training, technician training, electronics special use inspecting, assisting with proposed new electronics uses, miscellaneous shop and instrument repairs, purchasing of parts and supplies, staff

work, and other miscellaneous out of service contacts. It is unrealistic at this time to assume that maintenance of radio systems, plus the other additional varied duties, can be determined through volume-of-business indicators accurately enough to provide more than guides for comparing staffing needs in similar situations.

Anything more than personal estimates by regional electronic engineers of workload requirements for systems planning is next to impossible, due to the varied differences in planning processes between regions, and the low frequency of system replanning at each National Forests.

An objective, therefore, of organizing for system support is to provide a flexible organization, which can apply the proper amounts of skill at the proper times, hopefully expanding or contracting as determined by future communications program managers.

Exhibit C in the appendices is a collection of statistics on the existing electronic technician work force. This is the existing source of manpower from which any proposed organization must be developed. As a matter of interest, the average region contains sixteen forests, has eighteen forest electronic technicians and 1.4 engineers for a total of 19 people. The average Forest Service technician is 44 years old and has been in his current job for nine years out of a total Forest Service time of 13 years. The odds are two to one that this is his first and only Forest Service position. If not, he has served in at least one other position in the same region, but generally none other.

Organization alternatives for program execution at Regional and Forest levels (intra-regional) follows:

Alternative No. 1 -- This alternative (Chart 7) would retain the Forest communications and electronics system responsibilities at the National Forest level. The Forest Electronics Technician would remain a member of the Forest Supervisor's staff, providing:

1. Assistance in electronics and electric activities.
2. Direct support to the Forest's radio system.

The Regional Electronics Engineer would continue to provide limited technical guidance to the Forest Technician. He would provide staff assistance to the Regional Forester and Forest Supervisor in areas of electronics technology and

Departmental activities according to delegation. This alternative is basically the organization now in existence. It is fundamentally a one man to one Forest system concept, made up of a Forest Electronics Technician per Forest supported by a Regional Electronics Engineer per Region.

Advantages -- Alternative No. 1

1. Responsibility for the total system activity rests in one position - the Forest Electronics Technician.
2. This one-to-one basis tends to develop strength in system maintenance, due to the technician's complete familiarity with each system component.
3. The technician is supervised by the system user (Forest Supervisor).
4. This structure is in existence.
5. Would have minimum impact on existing technician position assignments.

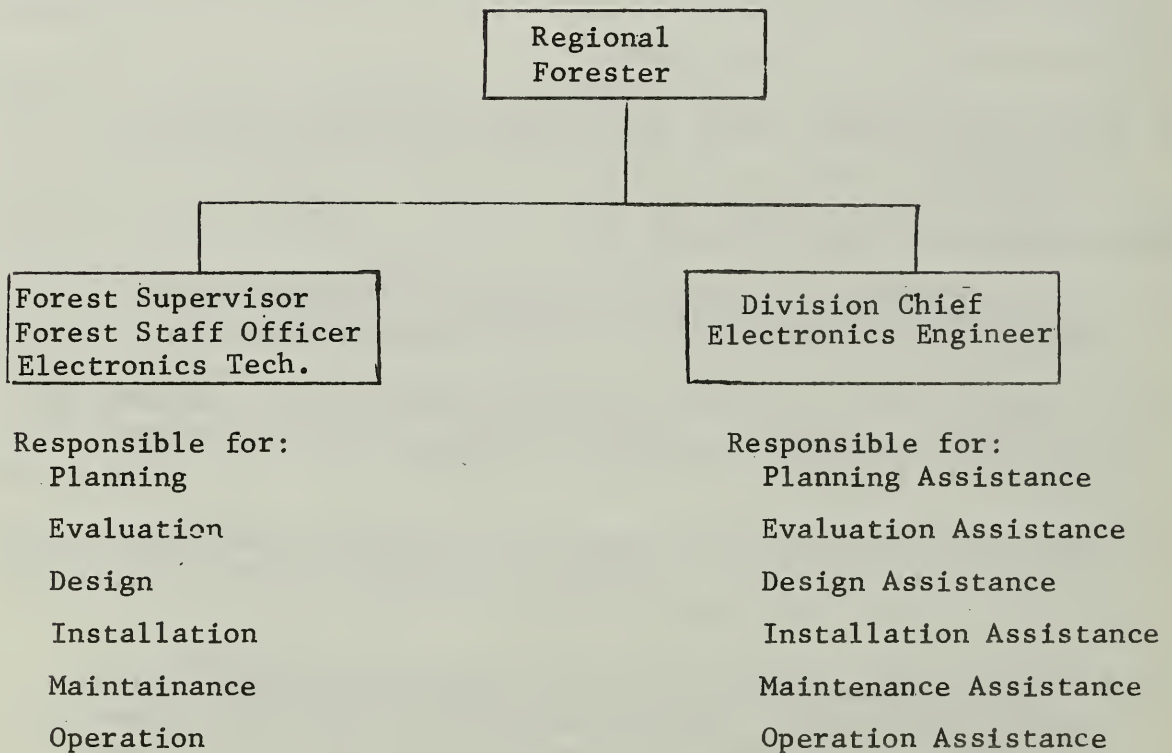
Disadvantages -- Alternative No. 1

1. It is difficult to develop technical and program management expertise in one individual - the Electronics Technician.
2. In reality, the technician has dual supervision in the persons of the forest staff for program guidance, and the Regional Electronics Engineer for technical guidance.
3. Emergencies in system maintenance and operation can limit or erode the time spent in system management (planning, evaluation, and consulting).
4. It is difficult to maintain consistency between national forests in technical competence and system workload. Program administration must be "hand tailored" for each Forest.
5. Communications engineering input to forest program development can be weak. It will become weaker as program planning demands increase. Increased professionalism in communications engineering, if required for interdisciplinary planning, would place severe demands on the existing number of electronic engineers.
6. The planning process tends to be standardized to such a degree that systems may be provided that are less effective than others using discretionary engineering competence.

INTRA-REGIONAL COMMUNICATIONS AND
ELECTRONICS ORGANIZATION

Alternative No. 1

(Existing)



7. The programming and planning workload on all forests is not sufficient to warrant developing all technicians to a professional level of planning competence.
8. It is difficult for the user (Forest Supervisor) to evaluate the effectiveness of the radio system and the Electronics Technician.
9. It is difficult for the Regional Electronics Engineer to evaluate the effectiveness of systems and technicians.
10. It is difficult to provide every system with needed additional technical assistance when demands exceeds one man's time and resources.
11. The Regional Electronics Engineering office is not staffed to accept an expanding role or program.
12. Should maintenance requirements at the system level change because of characteristics of solid-state equipment, organization may be too inflexible to efficiently react.

Alternative No. 2 -- This alternative (Chart 8) would separate system design from system operation. The Forest Technician would be responsible for system maintenance and operation and would be assigned to the Forest Supervisor's staff. The Regional communications and electronics organization would be responsible for systems design. It would also be responsible for procedures and assistance to Forests in system planning, evaluation, and installation. It would also have the staff responsibilities for Departmental activities and advanced electronic technology. The Regional Office organization would be staffed with electronics engineers to meet these requirements.

Technical assistance would be provided to the Forest Technician by the Regional communications and electronics staff in the areas of maintenance, repair, and system use.

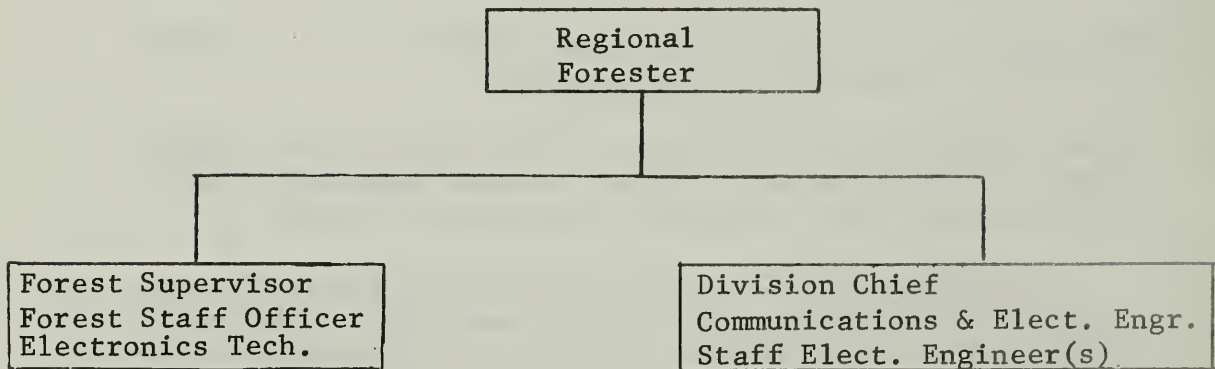
Advantages -- Alternative No. 2

1. Responsibilities for system maintenance and operation rest in one position - the Forest Electronics Technician.
2. This one-to-one basis tends to develop strength in system maintenance, due to the technician's complete familiarity with each system component.

INTRA-REGIONAL COMMUNICATIONS AND
ELECTRONICS ORGANIZATION

Alternative No. 2

(Proposed)



Responsible for:

Planning

Evaluation

Installation

Maintenance

Operation

Responsible for:

Planning Procedures and Assistance

Evaluation Procedures and Assistance

Design

Installation Assistance

Maintenance Assistance

Operation Assistance

Management of System

3. The technician is supervised by the system user (Forest Supervisor).
4. Would have minimal impact on existing technician position assignment.
5. Would strengthen planning and design functions, through increased electronics engineering staffing.

Disadvantages -- Alternative No. 2

1. In reality, the technician has dual supervision, in the persons of the forest staff for his administrative guidance, and the Regional Electronics Engineer for his technical guidance.
2. It is difficult to maintain consistency between national forests in technical competence and system workload.
3. It is difficult to provide every system with needed additional technical assistance when demand exceeds one man's time resources.
4. It is difficult for the Regional Electronic Engineer to evaluate the effectiveness of technicians.
5. Removal of planning and design responsibilities from technician's job may result in workloads too small to warrant a technician per forest.
6. Possible reductions in maintenance time requirements may result in same as 5.
7. Requires additional electronic engineers.

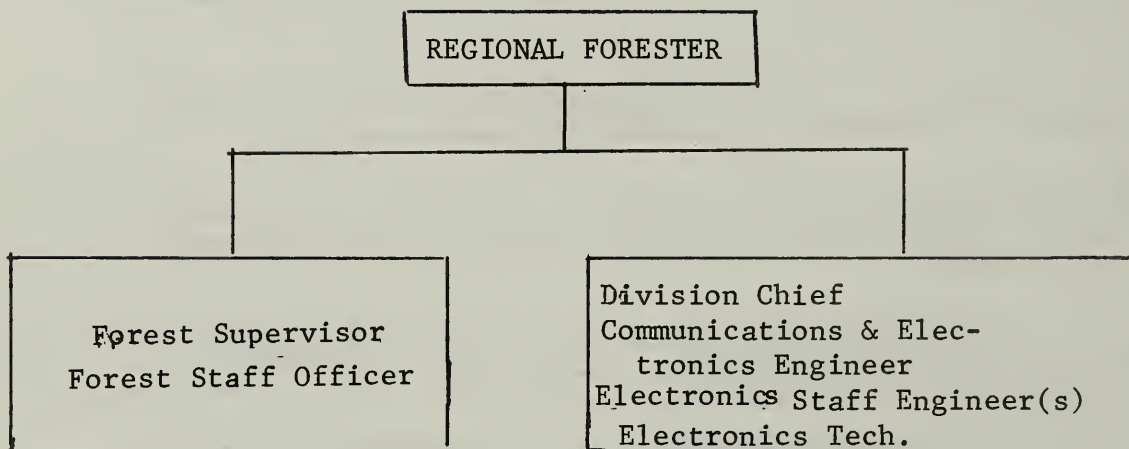
Alternative No. 3 -- This alternative (Chart 9) organization is oriented to electronics engineering supported by technicians. It is structured by task areas, and not by the one man to one system relationship.

This alternative is similar to No. 2 in the assignment of responsibilities to the Regional Communications and Electronics staff. It would, in addition, assume responsibility for system maintenance, both in terms of program management and individual system contribution.

INTRA-REGIONAL COMMUNICATIONS AND
ELECTRONICS ORGANIZATION

Alternative No. 3

(Proposed)



Responsible for:

Planning

Evaluation

Operation

Responsible for:

Planning Procedures and Assistance

Evaluation Procedures and Assistance

Design

Installation

Maintenance

Operation Assistance

Technical system support is accomplished by a team of technicians managed by the Regional Communications Engineer. There are three technical specialty groups involved. The first consists of highly skilled technicians supporting engineers in system planning and evaluation. The second is a centralized group of repair technicians performing component trouble-shooting and repair. The third, zoned according to need, perform direct system support functions of replacing unserviceable units, and training and consulting users in system use.

Advantages -- Alternative No. 3

1. Increased expertise in communications planning and systems design through increased engineer staffing.
2. More efficient use of skilled technicians engaged in component repair, due to centralization.
3. More efficient use of system maintenance technicians, because of flexible zoning of systems.
4. Provides advancement opportunities (broader grade structure) for technicians.
5. Technicians have "one boss".
6. Flexible organization can respond to changing situations.
7. Better evaluation of maintenance activities and technician's contribution by the communications and electronics staff than by Forest Supervisor.

Disadvantages -- Alternative No. 3

1. Greatest impact on existing technician force (shifting of people).
2. Requires additional engineers.
3. Increased general administration load on Regional Communication and Electronics Engineer.
4. Difficult to implement - must evolve.

Conclusions and Recommendations for Program Execution

The requirements for electronics technicians at the system level, such as the National Forest, may change in the future. For example, a more desirable manner of system maintenance may evolve if there is a shifting from preventive maintenance to breakdown maintenance. Technical assistance to Forest program managers could emanate to a greater degree from other sources, such as a regional electronic engineering staff. Overall management of the communications and electronics activities, including standards, procedures, and financing methods, may change. Changes in any of these areas will have a direct effect on the job of the technician as we know it now.

The extent of change, depending upon these currently intangible effects, cannot be explicitly determined. Even if the extent were determinable, the rate of change cannot be reasonably anticipated.

Specific recommendations for restructuring our technician organization, at this time, would be based entirely on assumptions about the future of the program, the potential intensity and direction of which has yet to be made explicit.

The primary consideration is not how all this will change our existing technician assignments, but will the organization be able to accommodate the changes that may be thrust upon it. These intra-regional organizational alternatives show that options are available to line officers and communications managers in restructuring the technical work force. Flexibility can and must be developed, if needed. (See Models in Appendices, Exhibit D)

Alternative No. 3 ultimately should provide the most flexible, responsive intra-regional organization. Program and organization management would become the responsibilities of the Communications and Electronics Manager. We believe this is the direction to move in organizing. However, it must be realized that in order to implement this type of a service organization, where the user (the Forest Supervisor in this case) no longer has direct responsibility for the operation of his system but must rely on another group (the communications and electronics group), the user must have confidence in the serving organization. This can be demonstrated only if professional expertise is adequately applied to his situation. Consequently, the following recommendation is pertinent:

RECOMMENDATION

RECOMMENDATION NO. 6

STRENGTHEN THE ABILITY OF THE REGIONAL BRANCHES
OF COMMUNICATIONS AND ELECTRONICS TO:

- a. ASSIST FOREST SUPERVISORS IN COMMUNICATIONS
PLANNING, SYSTEM EVALUATION, MAINTENANCE,
AND OPERATION.
- b. DESIGN INDIVIDUAL SYSTEMS INCLUDING HARDWARE
AND OPERATIONAL SPECIFICS.
- c. DEVELOP PROCEDURES FOR PLANNING, EVALUATION,
DESIGN, MAINTENANCE, AND OPERATION OF SYSTEMS.

B - FUTURE REQUIREMENTS

FUTURE REQUIREMENTS

Communications is defined as the process of giving or exchanging information. Communications is one of four relatively well defined sub-systems of the total information system. For perspective, the four information sub-systems are identified as:

1. Information Generation. The beginning of the information cycle includes such processes as information collection, identification, screening, classification, temporary storage, indexing, etc.
2. Information Communication. This is the shipment process which includes retrieval from temporary storage, forming for transmission and reception.
3. Information Processing. This is the storage, retrieval, and manipulation of information to obtain the necessary outputs for decision making.
4. Information Utilization. This stage is the sole reason for information. It is used by the decision maker to guide his action.

In the simplest information system, all four of these major sub-systems can and are performed by one person. The communications flow here is completely internalized. In more complex information systems, a host of people are involved because each of the sub-systems require a different specialist and many of the sub-systems themselves are subdivided into separate specialist functions.

The only technical sub-system studied and addressed in this study is the data transmission phase of communications. This phase involves the sending and receiving of information. Information transmission includes:

1. The selection and/or design of the facility which takes the appropriately formatted data and projects it into a carrying medium.
2. The selection or design of the carrying medium.
3. The selection or design of the data receiving and decoding facility. It is the contention of this study that most data transmission media and facilities are multi-purpose, i.e., they can effectively carry many different types of information.

The transmission system obviously cannot be designed independent of the data generator or the data receptor (user). But since many data sources and many data types can use the same transmission media, economic operation of data transmission requires that all data transmission decisions be made by the same design group so that maximum utilization of available media can be accomplished. This study, therefore, defines as the primary engineering tasks of the communications organization the selection and/or design of:

1. The informational data transmission (sending) device.
2. The media over which transmission takes place.
3. The receiving and decoding device at the receptor end.

This is true for all telecommunication data systems except mail or such other systems where the basic technology does not rest on electricity or electronics, or where the Forest Service has no transmission medium selection choice. Because of the expertise to be concentrated in this unit and the characteristics of the Forest Service, it is also suggested that this organization maintain its responsibility for the installation, replacement, and maintenance of Forest-Service owned information transmission and receiving devices.

Specifically excluded from the above definition are the devices and processes required for storing, retrieving, and manipulating data such as the hardware and software necessary for computers, microfilm, library information systems, etc. However, when computer data or microfilm data, etc., needs to be transmitted over long distance through a transmittal medium then the transmission process should be under the aegis of the communications and electronics organization. The management of radio frequencies, as the management of a transmission medium, naturally falls under the responsibility of this organization.

An allied responsibility is the continued evaluation and development of advanced electronics devices such as sensors, survey telemetry facilities, etc., needed by various Forest Service clients. This responsibility could be assigned, if desirable, to the electronics specialist of the data transmission organization at the Regional Office or the Washington Office. If the work load and specialization requirements became sufficient, this advanced electronic development could be separated at the Washington and Regional Offices from the data transmission specialties.

It is not envisioned that the advanced electronics group or the electronics engineering specialist at the Region be staffed to take over all development evaluation and design of electronic devices for such functional groups as engineering, insects and disease research, soil, watershed and snow management, etc. Often the specialists in the functional areas are better acquainted with their particular electronic apparatus than the electronics group at Washington or at the Region. However, both Washington and the Region should be available to advise, consult and assist the functional specialist or researchers in the selection, development and evaluation of electronic devices that deal with data accumulation and transmission.

Many of the Forest Service's communications and transmissions devices and media are either commercially or GSA owned or administered. They have been internally administered by the Administrative Services Group. Such local administration is appropriate and should be continued. The function of Administrative Services in this field, however, should be:

1. To review or approve requests when no engineering function is involved.
2. The financing of these requirements.
3. The administration of the installation.
4. Its maintenance, inclusive contracts and agreements with the commercial agencies and GSA.
5. The continued liaison with these communication facility suppliers.

Where alternative communication channels are available the decision on their selection and loading should remain with the Field telecommunications data transmission group because adequate skills for such decision would be available there.

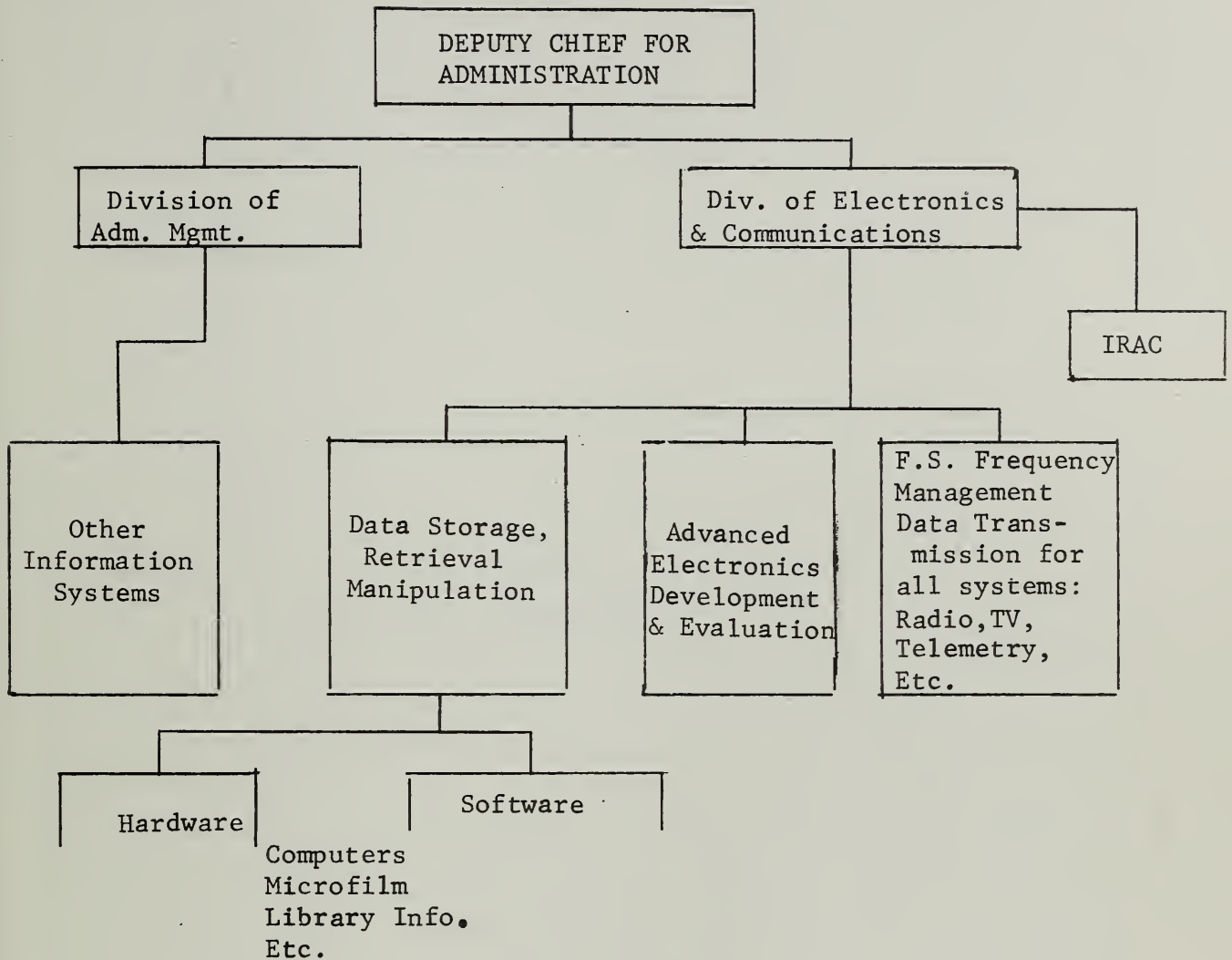
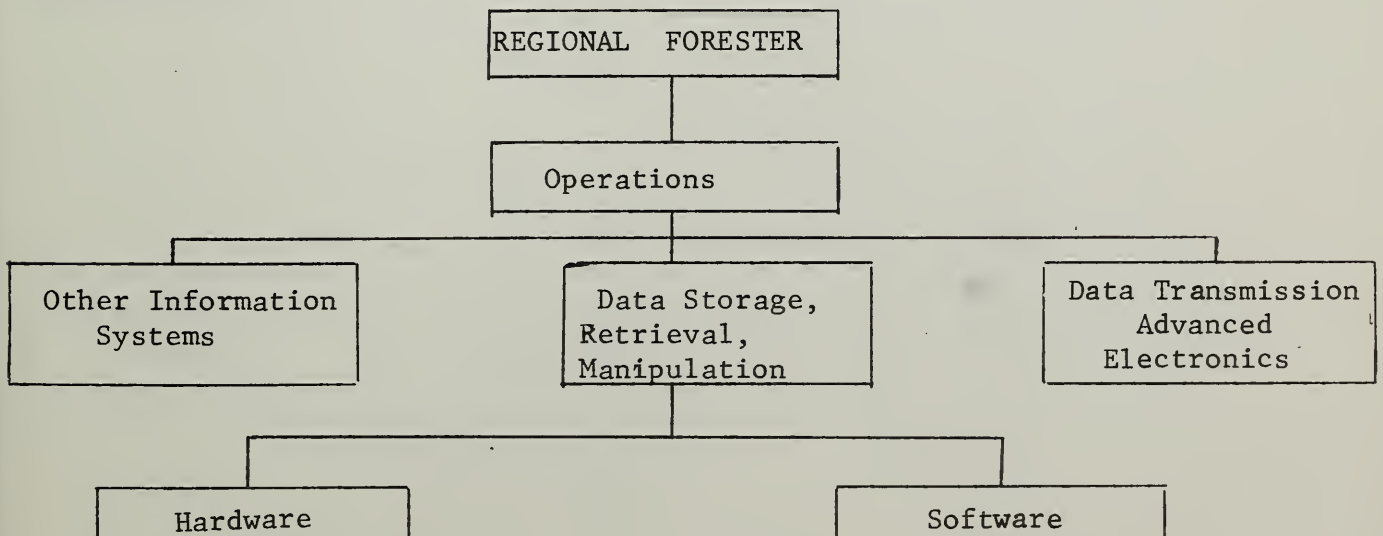
We visualize continued assignment of the Branch of Communications and Electronics to the Division of Administrative Management in the Washington Office. As the workload increases it is conceivable that a separate Division of Communications and Electronics (Chart 10) might be created with three separate branches:

1. Advanced electronics development and evaluation.
2. Data transmission and frequency management.
3. Data storage, retrieval, and manipulation.

The IRAC function would then be separated from the data transmission and Forest Service frequency management and be held directly under divisional control as shown in Chart 10.

At the Regional level the assignment of the Data Transmission and Advanced Electronics Group would continue under the Operation Chief and independent of the Data Storage, Retrieval, and Manipulation Group.

At the Forest level, the Electronics Engineer and/or Technician would operate under an Assistant Supervisor for Administration.

FUTURE ORGANIZATIONAL ALTERNATIVEWASHINGTON LEVELREGIONAL LEVEL

PART IV

FINANCING

FINANCING FOR FIELD TELECOMMUNICATIONS

Traditionally, the financing for communication has been included in a single P&M line item for Fire and General Improvements. The original rationale for doing this was fully justified because communications and structural facilities were all part of a basic system of support (Forest Service owned telephones and buildings) for protection and development activities.

Over a period of time, the practice has created some cumulative deficiencies in both structural improvements and field telecommunications. The extent of these cumulative deficiencies is probably more serious for field telecommunications than for structural improvements.

To illustrate, "basic" radio systems have been developed and these must be maintained from P&M line item funds. There are few alternatives to turn to in case of necessity. Yet, the total demands for maintenance, replacement and expansion are accelerating. Conversely, alternative ways of obtaining structural improvements are often available, such as leasing of office space through GSA, construction by the Civilian Conservation Corps, and occasional programs such as the accelerated public works program. In addition, proportionately less housing for employees is being required and/or provided at field locations as road systems improve and commuting distances are expanded from private rental markets.

To fully understand the internal competition the present system is generating, it is probably best to look at the communications activity from the Regional Electronics Engineers standpoint. Briefly, the line officers from the District Ranger through the Regional Forester (Regional Communications Committee) are planning and approving a level of field communications that they believe is required to do the resource protection and management job. The approved plans are basically used by the Regional Electronics Engineer and/or Forest Technician as annual and long range plans of work.

As outlined by FSM 6522.56, (Appendices, Exhibit E) dollars for maintenance of a "basic" communication network must come from the F&GP line item. Additions to the "basic" network must come from the construction (FA&O) line item. Project radios can be added and maintained from project funds, but this only further burdens rather than helps a "basic" network. In addition, the replacement of components of a "basic" network such as replacement of low band equipment with high band equipment has been termed construction rather than the maintenance of an established

network by replacement of component parts. F&GP and FA&O funds have been very limited in recent years, and since the regions can not make general assessments for communications, the deficiencies have accumulated.

For example, the Regional Electronics Engineers estimate, according to existing and approved plans:

1. A \$6.3 million backlog of needed replacement has accumulated.
2. \$1.8 million is needed annually to keep the replacement program current (\$532,100 received in F.Y. 1971).
3. \$4.1 million is needed annually for preventive maintenance (1.8 million received in F.Y. 1971).
4. \$.3 million is needed annually for new construction and expansion of "basic" networks.

Figures do not include R-10 or Washington Office assessments. See appendices Exhibit F for basic figures. Also, these figures do not reflect pressing demands for large multi-fire communications.

As a further contrast, additional commercial telephone service can be authorized by practically any responsible Forest officer, and he can also generally initiate the assessment and holding of funds in a general expense account for paying for commercial services.

Consequently, the Regional electronic organizations are receiving criticism from line management for not providing the level of communications planned and approved. From the Regional Electronic Engineers viewpoint, the appropriated funds are inadequate for doing the job, the Regional Forester can no longer assess other funds to help him out, the accumulation of multi-year deficiencies are reflected in many sub-standard obsolescent Forest networks, and large multi-fire communication needs are not being recognized. From his standpoint, it is a bleak looking situation.

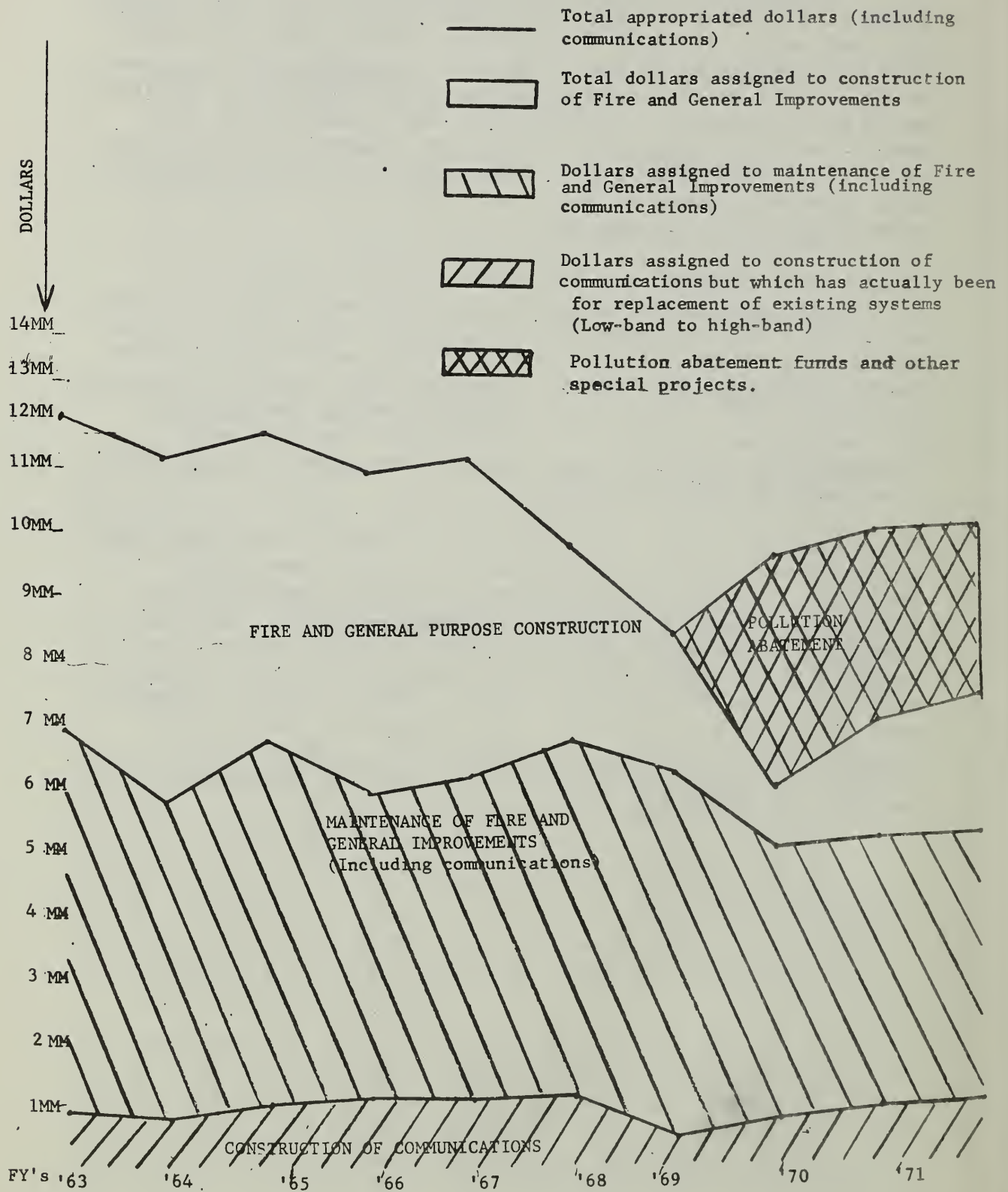
The communications construction activity (conversion of low band to high band equipment) has received a relatively stable portion of the F&GP and FA&O financing available during the 1963-72 period. As shown in Chart 11. The critical point, however, is that the financial resources available for both general purposes improvements and communications has declined

by 24% since 1963. During this same period, the consumer price index of all items has risen from 106.7 to 140.7 or 34.0 points. In other words, it takes \$1.40 in 1971 to buy the same product that sold for \$1.07 in 1963. This is an inflationary increase of 32%. This has occurred at the same time that field requirements have accelerated for buildings and communications and special projects have placed additional demands on the program. (i.e. - pollution abatement) Communications should be described as a separate program so the total ramifications of both programs can be fully understood.

Construction programs can and probably should continue to be the logical ones to be reduced in times of austerity. Yet, the maintenance and replacement portion of any basic support system should have relative stability to provide continuing long-term quality service. The need to strengthen this concept is apparent in the F.Y. 1971 Interior and Related Agencies Appropriation Bill whereby maintenance and construction line items were separated for the first time. Construction funds were granted a no-year-end carry over status.

The necessity to meet large multi-fire communication needs and do a balanced and quality management job with less people indicates the Forest Service should consider communications and electronics as a separate, and basic activity. The field communication networks should be maintained and replaced as required to adequately support protection and resource development activities in the field. This is where resource management decisions are executed. The systems more than pay for themselves in efficiency and effectiveness. Briefly, the relevant financial alternatives that should be considered are shown on the following pages.

CHART 11



DESCRIPTION OF ALTERNATIVE

Alternative No. 1

Make no changes. Continue with present system under separated F&GP maintenance & FA&O construction programs.

Prior to FY 1971, financing for the maintenance and construction of the telecommunications system has been included in one line item statement (green sheet) which states:

"Construction and maintenance of improvements in fire and general purposes (including communications)" for a total of \$9,517,000 for FY 1970.

For FY 1971, the same statement on the green sheet is repeated to show approved House-Senate joint action for a subtotal of \$6,290,000 (page 1). However, an additional amount of \$3,136,000 is shown (page 3) for construction on a no-year end funding basis. This was the first year for this type of funding for F&GP & FA&O. The total was \$9,426,000.

ADVANTAGES

1. One budget item covers both fire and general improvements and field telecommunications. Less detail to consider.
2. Resource programs do not have to contribute funds directly to maintenance, replacement, and construction of basic telecommunications nets.

DISADVANTAGES

1. Structural needs and telecommunication needs are not fully separated so their relative priorities are fully considered and understood Service-wide.
2. Both structural improvements and field telecommunication replacement needs are continuously subject to austerity adjustments when construction programs are cut back.
3. Relatively unimportant, minute, and individual field telecommunications replacement and/or construction projects may become subject to unnecessary review and approval in the future.
4. No realistic recognition of the relative importance of field telecommunications in program support to field activities.
5. Regions are forced to make choice between buildings (housing) or field telecommunications when they are not really comparable.

DESCRIPTION OF ALTERNATIVE

Alternative No. 2

Separate the field telecommunications and electronic uses activities from the F&GP (maintenance) and FA&O (construction) and put the maintenance and replacement phases under a working capital fund. Retain the establishment or expansion of administrative systems and or fire nets through a field telecommunications construction line item.

ADVANTAGES

1. The field telecommunications program would have a relatively stable financial base for support of the essential maintenance and replacement activities. These must be done on a scheduled basis to meet field requirements.
2. Provide better cost data.
3. A working capital fund would provide a control mechanism whereby the manager (Line or Staff) who requests service must also generally provide the financial means for supporting such service.
4. Telecommunication technicians and Electronics Officer would not receive instructions from Line Officers to provide additional service when no dollars are available to pay for the service.
5. Additional service will not be provided at the expense of a rational replacement program.
6. Flexibility for using all types of funds for maintenance increased.

DISADVANTAGES

1. If the accelerated use of field communications pays off in a more effective and efficient work force and service to the public, any severe limitation of construction dollars prohibits the capturing of such benefits.
2. Construction funds will still be subject to austerity programs and reduced accordingly. Planned and justified expansion cannot be accomplished on a scheduled basis.
3. The additional cost of managing a WCF system is added.
4. Resource functions must pay maintenance and replacement cost.
5. No guarantee that project funds will be increased proportionately to absorb the shifting of maintenance and replacement activities from F&GP line items (less total funds may be appropriated).

DESCRIPTION OF ALTERNATIVE

Alternative No. 3

Same as 2, except request special consideration for a one shot combination replacement (catch up) and construction (expansion) attempt upon starting a WCF system. Then, continue to maintain a separate field telecommunication line item for future construction (expansion).

ADVANTAGES

1. The advantages would be similar to the list under Alternative No. 2, item 1-6.
2. In addition, a separate line item for field telecommunications that combined immediate replacement and construction needs as a one-shot lump sum would get WCF off to a running start.

DISADVANTAGES

1. Same as under Alternative No. 2, items 1-5.
2. Special consideration must be made to Department and OMB for "catchup" work.

DESCRIPTION OF ALTERNATIVE

Alternative No. 4

Separate the field telecommunications activity from F&GP (maintenance) and FA&O (construction) and place the maintenance and replacement phases under a working capital fund. (Structural improvements could also go to WCF).

Request special consideration for a one shot (1 year) combination replacement (catchup) and construction expansion attempt to initiate the WCF system for base systems.

Maintain a separate FA&O line item for future construction (expansion and growth) in succeeding years.

Attempt to provide development funds for large fire telecommunication nets as part of fire prevention and suppression in line item 20. Maintain and replace with separate WCF identification after established.

ADVANTAGES

1. The advantages would be same as under Alternatives 2 and 3.

2. In addition, the communication requirements for large fire management are accelerating rapidly (i.e., multi-channel air net systems and intra-sector). These needs should have a better chance for financing if tied into the fire prevention and suppression function which is the primary purpose.

3. Same initial replacement (catching up) could be accomplished before going to WCF, thus better quality equipment to start with.

4. The WCF system could become less of a control system based on current and fixed dollars, and more responsive to fully justified future needs.

DISADVANTAGES

1. Same as Alternatives 2 and 3.

2. In addition, separates the sources of financing for development of administrative nets and large fire nets which may be questioned. Yet, believe there are sound and **fully justifiable** reasons for doing so.

3. Field telecommunications would have to compete with resources (timber, recreation, etc.) as opposed to structural improvements for a share of available dollars. (May not be competitive).

DESCRIPTION OF ALTERNATIVE

Alternative No. 5

Eliminate the maintenance and replacement for field telecommunications from the F&GP line item. (Structural Improvement)

Proportionately increases the financing requested in each program area to cover the cost of communications. Assess each program area to pull the necessary funds together for maintenance and replacement of field telecommunications. Create a "general expense" type fund similar to that used to pay for commercial telephone service.

Retain a field telecommunications and electronic uses line item for (construction) expansion of the system.

Attempt to provide development funds for large fire telecommunications nets as part of fire prevention and suppression in line item 20. Maintenance and replacement would have to come from assessment of fire control funds similar to fire cache funding now provided.

ADVANTAGES

1. Provides a more stable basis for the long-term maintenance and replacement of components of field telecommunications.

2. Eliminates some of the present tendency for field telecommunications maintenance and replacement dollars to continually be subject to Government-wide austerity programs.

3. Does not require a specific annual act of Congress before a District Forest Ranger can replace a justifiable and existing point to point communications link of his approved system.

4. Provides a more reasonable and rational basis for management of a basic supporting system to all field activities.

5. Additional costs of managing a WCF system would not be created, but need for a system to assess resource funds may off-set this advantage.

6. Frustration of field employees would be reduced and morale increased accordingly.

7. Would probably be the easiest and most convenient method of providing the supporting system that line managers say they must have to do the field work.

DISADVANTAGES

1. The line item for construction (expansion) dollars would continue to be subject to Government-wide austerity programs and it probably should be.

2. Accurate cost accounting data would probably not be developed for long-term management as would come from a WCF system.

3. Costs of construction, maintenance and replacement of field telecommunications may tend to be viewed as over-head rather than facility support costs.

4. Functional program dollars would be subject to an "additional assessment" from the resource staff point.

5. Total overall appropriated dollars could be reduced if the FA&O line item is completely eliminated and if fewer line items result in less total dollars.

DESCRIPTION OF ALTERNATIVE

Alternative No. 6

Separate the field telecommunications and electronic uses activities completely from the F&GP (maintenance and FA&O (construction) line items.

Create one separate P&M line item for field telecommunications and coordination of electronic uses.

Justify the procurement, maintenance, and replacement of all components of the total system under single support program for resource management. (Administrative, Zone, Air, and Large Fire Nets are components of one overall field telecommunication requirement for supporting resource management protection and development programs).

ADVANTAGES

1. Fully justified field telecommunication needs can be described and processed through Dept., OMB & Congress.

2. Should provide better stability for maintenance and replacement programs.

3. Resource programs do not have to contribute funds directly to maintenance, replacement and construction of basic field telecommunication nets.

4. Rapidly accelerating mission and role of field telecommunications can be described and justified.

5. Pressing need for large fire communication nets as a supplement to administrative nets can be better described as part of total package.

6. Field telecommunication requirements are fully identified for review at all levels.

7. Additional expenses of WCF system avoided.

DISADVANTAGES

1. Creates additional budget line item.

2. Lessens ability of Forest Service to trade off between communications and structural improvements if necessary.

DESCRIPTION OF ALTERNATIVE

Alternative No. 7

Modify the existing procedure (alternative 1) by separating the P&M line item for fire and general purpose (F&GP) improvements into (a) maintenance of fire and general improvements (structural), and (b) procurement, replacement, and maintenance of large multi-fire and administrative radio systems.

Under the "Construction and Land Acquisition" heading, retain the no-year-end item "construction for fire, administration, and other purposes" (FA&O) for buildings and continue the construction of communications buildings, towers, etc. from the funds.

ADVANTAGES

1. Same budget line item continues to cover both fire and general improvements and field telecommunications.
2. Resource programs do not have to contribute funds directly to maintenance, replacement and construction of basic telecommunications nets.
3. The expanding importance of field communications for administrative, fire through initial attack and large multi-fire situations can be better explained and understood.
4. Replacement of "basic" radio nets should not be confused with the construction of telephone lines and buildings.
5. Creation of a new and separate budget line item not necessary.

DISADVANTAGES

1. Structural needs and field telecommunication needs are not completely separated so their relative priorities may be fully understood and considered.
2. Relatively unimportant, minute and individual field telecommunications replacement and/or construction projects may become subject to unnecessary review and approval in the future.

After considering the advantages and disadvantages of the seven alternatives and weighing the apparent long-term impact, recommendation number seven is as follows:

RECOMMENDATION NO. 7

MODIFY THE EXISTING PROCEDURE BY SEPARATING THE P&M LINE ITEM FOR FIRE AND GENERAL PURPOSE (F&GP) IMPROVEMENTS INTO

- a. MAINTENANCE OF FIRE AND GENERAL IMPROVEMENTS (STRUCTURAL).
- b. REPLACEMENT AND MAINTENANCE OF RADIO AND/OR ELECTRONIC SYSTEMS.

BUILDINGS FOR COMMUNICATIONS, ANTENNA TOWER CONSTRUCTION, AND ADDITIONS TO ESTABLISHED COMMUNICATIONS SYSTEMS SHOULD BE RETAINED IN THE "NO-YEAR-END" CONSTRUCTION ITEM FOR FIRE, ADMINISTRATION, AND OTHER PURPOSES (FA&O).

PART V
MANAGEMENT SYSTEM

MANAGEMENT SYSTEM

To provide a viable system the recommended Washington Office field telecommunications manager should initiate an annual close-cycle management process.

Chart 12 illustrates the general process that is required. Realistically, the process must provide an efficient and effective Producer - User dialogue. The Washington Office being the producer and the field the user. Acceptable results require the effective performance of two roles: That of producer as spokesman for the means, and that of user as spokesman for ends. The user (field) is primarily responsible for determining what needs to be done while the producer (W.O.) is primarily responsible for determining how results can be achieved. Together, through an open and active dialogue in which the user (field) is spokesman for "demand" and the producer (W.O.) for "supply", they hammer out the best compromise between what is desirable to have and what is possible to get.

RECOMMENDATION NO. 8

THE MISSION AND OBJECTIVES STATEMENTS, TOGETHER WITH THOSE RECOMMENDATIONS IN THIS ENTIRE REPORT (VOLUMES I THROUGH IV) APPROVED BY CHIEF AND STAFF, SHOULD BE INCORPORATED IN FOREST SERVICE DIRECTIVES TO SPECIFY THE PROPOSED MANAGEMENT SYSTEM. THE DIRECTIVES SHOULD CONTAIN THE FOLLOWING ELEMENTS:

- a. THE REQUIRED INFORMATION FLOW SHOULD ENCOURAGE THE FIELD TO MORE FULLY ANALYZE ITS REQUIREMENTS.
- b. ELECTRONICS ENGINEERING SHOULD RESPOND WITH AN OPTIONAL TECHNICAL AND ECONOMIC DESIGN COORDINATED WITH ALL OTHER COMMUNICATION REQUIREMENTS FOR A MINIMUM COST.
- c. FIELD TELECOMMUNICATIONS MANAGEMENT SHOULD CAREFULLY BUDGET FOR THE NECESSARY FINANCING FOR THOSE COMMUNICATION ELEMENTS CONTRIBUTING MOST TO THE FOREST SERVICE MISSION.

PROPOSED MANAGEMENT PROCESS FOR
COMMUNICATIONS AND ELECTRONICS

ALLOCATION OF RESOURCES
AND TASK ACCOMPLISHMENT

WANTS--NEEDS
(SYSTEM INPUTS)

Administration Policy
and Direction

USDA Policy & Direction

P&PA Inputs

F.S. Policy, Direction,
Standards and Budgeting
for procurement mainten-
ance, and replacement;
and coordination with
other F.S. programs

Service-wide coordination
of planning and budgetary
requests.

Key action position is com-
munications manager who
must coordinate communi-
cations with all Service-
wide programs.

Allocation to Air
Nets, Fire Nets
and Zone Systems

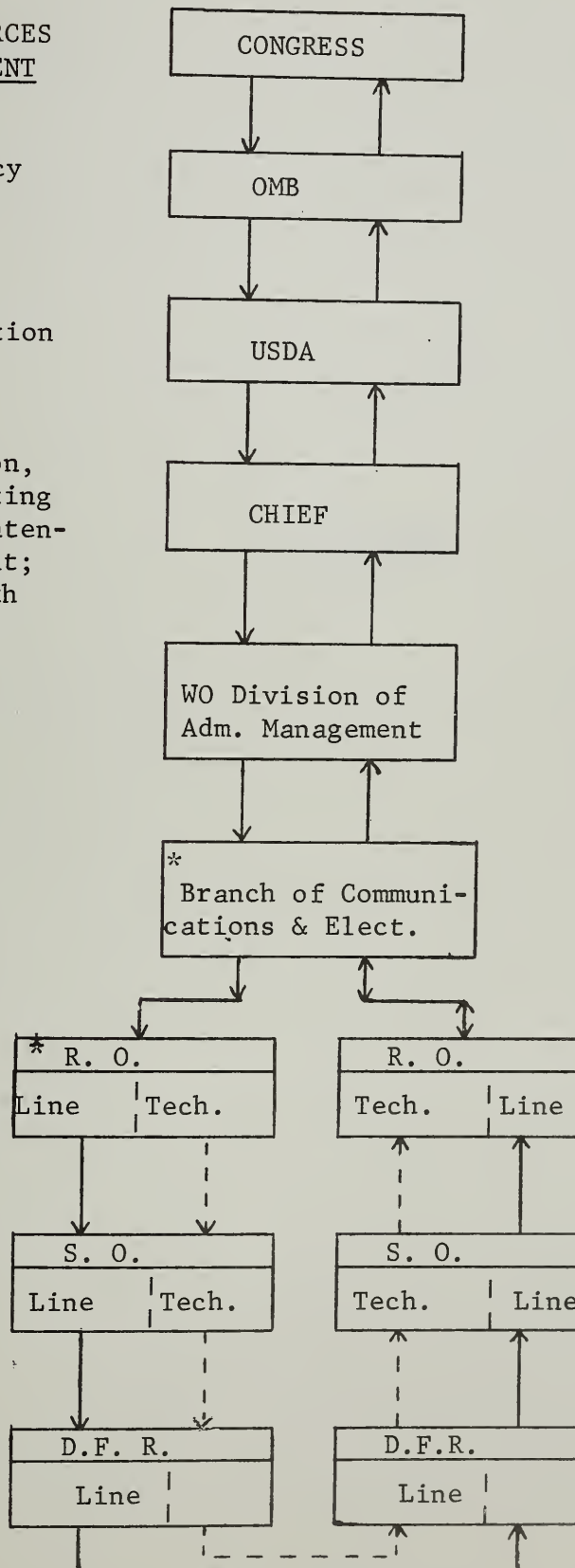
Coordination of plans,
analysis of air, fire and
zone wants and conversion
to feasible needs.

Allocation to
Forest Nets and
Systems

Unit planning, technical
analysis and conversion of
wants to feasible needs.

Allocation to
Districts

District wants



*Communications manager is key position required in the management process

APPENDICES

Position No. _____

ELECTRONICS TECHNICIAN, GS-856-111. INTRODUCTION

This position is in the _____ Branch of the _____ National Forest under administrative supervision of the _____. The incumbent has technical and management responsibility for the planning, development, installation and maintenance of the extensive and complicated communications systems for the _____ National Forest.

The systems, which are required to meet the heavy and exacting resource management requirements, include: (1) the extensive and complex forest network of fixed control stations, radio link systems, semi-fixed and portable stations, automatic repeater installations, mobile installations and a large portion of portable units which are of the low power VHF miniaturized types, (3) forest portion of the service-wide air network which includes a radio link system and low powered VHF miniaturized portable units, (3) forest portion of the Region-wide fire service network which includes a radio link system and portable base stations, (4) a telephone network.

The communication facilities are subject to extremely heavy traffic handling demands and/or heavy on-forest and adjacent area "competitive" electronic type use, dictating intensive technical exactness and coordination.

2. PRINCIPAL DUTIES AND RESPONSIBILITIES

Has both technical and program management responsibility for the planning, development, installation and maintenance of complicated, extensive communications systems. Prepares plans and proposals for modification of existing systems and evaluates proposals of new systems to meet the changing needs of protection and administration of forest resources in an extensive mountainous area.

This includes: (1) working closely with all departments of the forest (fire control, engineering, lands and timber, etc.) to be currently informed as to their present and future communication needs; (2) working out and recording specific signal paths and general area coverage for the frequencies in use, or proposed by means of field coverage checks and by profiles drawn from topographical maps; (3) determination of special installation requirements considering operational limitations imposed by competitive type interference, topography, climate, etc.; (4) compilation and maintenance of complete and partial forest communication plans including systems maps and narratives as required for Regional approval; (5) prepares for consideration in budgeting, realistic estimates of funds needed in various activities, keeps accurate record of expenditures and reports periodically on their relationship to the budget; (6) determines replacements and new equipment needs and

priorities and, within budget limitations, obtains and assigns or installs the equipment; (7) based on approved communication plans and service-wide/regional standards, determines work to be done and establishes priorities; (8) schedules assignments of self and subordinates.

Is responsible for and with the help of subordinates, performs the installation and maintenance of the forest two-way radio systems. Types of equipment include FM very high frequency fixed base station units; radio link systems; automatic radio repeater units; semi-portable station type units; mobile units; portable low powered miniaturized VHF units; selective radio calling, switching and signaling devices; remote control consoles; extended operate controls; monitor receivers and directional antenna system. Performs pre-installation technical checks and inspections of new radio equipment to assure compliance with established service and contract specifications. The installation, adjustment and maintenance of the radio equipment includes making approved standard modifications in new equipment to meet local operating conditions and needs; to "match" the new pieces to the existing system and to modify the existing system (e.g. "narrow banding").

Schedules preventive maintenance checks to assure reliable technical and operational performance. Makes emergency or non-scheduled repairs on equipment and does routine service work as required. Directs the accomplishment of installation, maintenance, repair and servicing based on sound analysis, applicable basic electronic theories, intimate knowledge of equipment and the proper application of standard test equipment and procedures. After repair or servicing, certifies equipment is performing within acceptable tolerances and standards.

- Is responsible for the installation and maintenance of the forest telephone system which consists of automatic, dial and/or magneto type equipment. Systems include metallic and ground return type lines, phantom circuits, aerial and underground cable installations, audio and ringing repeaters, special lightning protected telephone installations, subscriber type telephone installations and extensions. Directs maintenance of lines and installations in good working order to meet service-wide and regional installation and performance standards. -

Maintains accurate and current records of frequency usage on forest, inventory of all forest communication units as well as the general inventory items, records of periodic service performed on each item in communication unit inventory. Insures that properly prepared time and attendance reports, per diem claims, vehicle log sheets, etc. are submitted on due date.

*- Inspects and reports on Special-Use electronic application and permits such as, but not limited to, microwave, television, radar, radio broadcast, VHF and UHF communications, installations, etc. This involves plans evaluations and/or on-the-ground tests to assure overall technical compatibility with existing and planned Forest Service electronic installations within the area.

Reports recommend for or against the granting of the permit from a technical electronics stand-point and includes statements of the necessary modification costs for Forest Service equipment. Critical problems of interference and potential desensitization are very frequent due to the extremely intense development of the electronics sites on the Forest and the crowded condition of the radio frequency spectrum. -*

- Investigates and reports on electronic interference problems affecting forest's communications. Recommends action to be taken if the interference is from non-Forest Service equipment or takes the necessary action to correct Forest Service equipment. May also make field inspection and tests when trespass is suspected. -

Provides guidance, training and inspection of lower grade technicians to assure job execution in accordance with performance standards. Trains operators of communication equipment in proper radio discipline and correct procedures.

Is responsible for technical training and supervision of electronic use and electronic safety for forest personnel, Fire Radio Operator and employees of cooperating agencies in the proper use, maintenance and care of electronic equipment.

Personal work contacts are made with technicians and other representatives of cooperating agencies and commercial concerns to discuss mutual problems of communication, transmission, proposed developments or changes, joint use of facilities, etc.

3. CONTROLS OVER THE POSITION

Administrative supervision is provided by superior with very limited technical guidance by the Regional Electronics Engineer. Guidelines are provided by established service-wide and regional standards, manuals, handbooks and technical publications.

4. OTHER SIGNIFICANT REQUIREMENTS OF THE WORK

High value and heavy use of the forest's resources, large area, complex fire and resource organization, and extreme fire and flood hazard conditions places heavy demand on the forest's extensive communications systems. Efficient management and protection requires an effective and continually operating network. Failures to provide and maintain such a service can result in heavy resource loss to both private and public lands, adverse public criticism, possible injury and loss of life.

Must be qualified to interpret formulas and equations for making an analysis and evaluating the problems. Understands the trouble symptoms and limitations of these complex nets - understands testing devices and must apply a knowledge of specialized skills. During emergencies the need for speed of correction and location of the equipment often does not permit him to consult a guide or have the aid of bulky test equipment - relies on his theoretical knowledge of the systems and extensive background in electronic analysis.

Communication activities include a number of arduous and hazardous elements; such as, working with telectrical equipment, climbing with spurs, automobile, foot and horseback travel to remote and isolated areas. An alertness to safety precaution and planning is required.

Must have sufficient ability and competence to be a licensed operator of motor vehicles required by the job.

Must frequently travel alone over hazardous mountain roads.

GUIDELINES FOR FIGURING FOREST ELECTRONIC TECHNICIAN WORKLOAD

(Ref. 7211.32 - Radio Technician Handbook (FSH))

Maintenance Hours

Central station and repeaters	5 hr - 4 times/yr = 20 hr/yr
Batter repeaters	5 hr - 3 times/yr = 15 hr/yr
Remote consoles	1 hr - 2 times/yr = 2 hr/yr
Aircraft mobile	4 hr - 2 times/yr = 8 hr/yr
Mobiles	4 hr - 4 times/yr = 16 hr/yr
Portables	3 hr - 3 times/yr = 9 hr/yr

Installation Hours (Recurring Jobs)

Central stations and repeaters	56 hr/installation
Mobiles (1/3 the total in system)	24 hr/installation
Miscellaneous improvements and special jobs	160 hr/yr

Other Jobs

Records, reports, office, work plans	120 hr/yr
Operator training	80 hr/yr
Technician training	80 hr/yr
Electronic special-use inspection	4 hr/use
Proposed new electronic uses	16 hr/new use
Miscellaneous shop and instrument repair	80 hr/yr
Purchasing parts and supplies	40 hr/yr
Staff and other miscellaneous out-of-service contracts	80 hr/yr

Estimated Travel - 10,000 to 15,000 miles

250 hr.

SUMMARY OF INFORMATION

CONCERNING ELECTRONICS TECHNICIANS
IN THE REGIONS

I. Average Region - -

- Has 16 Forest Organizations
- Has 1.5 Electronics Engineers
- Has 18 Electronics Technicians

II. Average Technician - -

- Is 44 years old
- Has been in current position for 9 years
- Has been with the Forest Service for 13 years
- Is GS-10

III. Position Information By Regions - /1

	Region							<u>Average</u>
	<u>One</u>	<u>Two</u>	<u>Three</u>	<u>Four</u>	<u>Six Ten</u>	<u>Eight</u>	<u>Nine</u>	
Number field:	23	11	12	22	26	24	9	18
Filled from:								
Within Region	12	6	3	2	8	7	4	6
Without Region	0	2	5	2	0	1	0	1
Out of USFS	11	3	4	18	18	16	5	11
Average Incumbent:								
Age	42	41	48	40	44	47	50	44
Years in Position	9	6	6	UNK	11	9	15	9
Years in USFS	10	8	13	9	13	15	19	13
Immediate Predecessor:								
Number of	20	8	8	22	22	14	2	14
Age	37	43	53	31	42	47	49	40
Years in Position	4	6	12	3	7	10	11	6
Disposition:								
Transferred within Region	7	4	3	12	8	7	0	6
Transferred without Region	4	2	0	3	1	0	1	2
Left USFS	9	2	5	7	13	7	1	6

/1 As of 10/71, exclusive of Region Fire

MODELS OF A COMPOSITE REGION

ORGANIZED UNDER THREE POSSIBLE ALTERNATIVES

(Positions and Costs)

These models are presented to show a range of positions and costs which might be expected between the three alternatives of organizing within the Region.

These comparisons are made using Model I (An Average Region currently) as a base and do not specifically reflect any expanded communications and electronics program. These are conceptual comparisons--not structural designs.

1. Model I - Intra-regional Alternative No. 1

Current Composite Region of Sixteen Forest Organizations

<u>Location</u>	<u>Position</u>	<u>GS-Grade</u>	<u>Number</u>	<u>Salary Ea.</u>	<u>Annual Costs</u>		
					<u>Total Salary</u>	<u>Operating</u> ^{/1}	<u>Total</u>
RO	Electronics Engineer	13	1	\$20,000	\$20,000	\$5,000	
RO	Electronic Technician	12	1	17,000	17,000	4,000	
SO	Electronic Technician	10	18	13,000	234,000	58,000	
Totals - Model I			20 ^{/2}		\$271,000	\$67,000	\$338,000

/1 Space, travel, overhead (25% of salary)

/2 1 Elec. Eng., 19 Elec. Techs.

2. Model II - Intra-regional Alternative No. 2

Hypothetical Region of Sixteen Forest Organizations

<u>Location</u>	<u>Position</u>	<u>GS-Grade</u>	<u>Number</u>	<u>Salary Ea.</u>	<u>Annual Costs</u>		
					<u>Total Salary</u>	<u>Operating^{/1}</u>	<u>Total</u>
R0	Elec. Eng. (Program)	13	1	\$20,000	\$20,000	\$5,000	
R0	Elec. Eng. (System Design)	12	1	17,000	17,000	4,000	
R0	Elec. Eng. (Plan, Eval.)	12	1	17,000	17,000	4,000	
R0	Elec. Tech. (Tech. Assis.)	11	1	14,000	14,000	4,000	
S0	Electronic ^{/2} Technician	10	16 ^{/3}	13,000	208,000	52,000	
	Totals - Model II		20 ^{/4}		\$276,000	\$69,000	\$345,000
	Totals - Model I		20 ^{/5}		271,000	67,000	338,000
	Difference		0		+5,000	+2,000	+7,000

/1 Space, travel, overhead (25% of salary)

/2 (Maintenance, Installation, Operation)

/3 One per Forest

/4 3 Elec. Engrs., 17 Elec. Techs.

/5 1 Elect. Engr., 19 Elec. Techs.

TITLE 6500 - FINANCE AND ACCOUNTING

4. Fire protection stations.
5. Fire crew barracks.
6. Smokejumper installations.

6522.55 - Aircraft Landing Fields. *-Landing fields and facilities, heliports, and helispots will be financed from the appropriation primarily benefiting. Construction will be financed entirely from the construction appropriation or entirely from other appropriations. Maintenance will normally be financed from P&M funds for "Maintenance of Fire and General Purpose Structural Improvements (Including Communications)." *- When use by another program is expected to be in excess of 5 percent, that program will finance the maintenance in proportion to its estimated use.

6522.56 - Communications System

1. Telephone. Construction of the permanent telephone communications systems, with few exceptions, will be financed from *-construction funds. Maintenance of the communications system, with few exceptions, will be financed from P&M funds for "Maintenance of Fire and General Purpose Structural Improvements (Including Communications)." *- Examples of exceptions are:

- a. When funds are made available through cooperative agreements for use of the system.

- b. When a line is constructed and maintained for the sole use of a project and is not needed to maintain contact with the project personnel for fire protection purposes. Such facilities usually would be temporary for the duration of the project need.

2. Radio

- a. The radio system consists of two major categories of facilities:

- (1) The "basic" general administration and fire protection network.

- (2) "Project" communications facilities that are purchased to facilitate project work.

- b. Financing of additions to and maintenance of the radio communications system, both ground and air networks. *-See FSM 6510.42, item 15, for use of the construction appropriation. *-*

6522. 57

TITLE 6500 - FINANCE AND ACCOUNTING

(1)*-Additions to-* the "basic" network will be financed from *-construction funds. The maintenance of the "basic" network will be financed from P&M "Maintenance of Fire and General Purpose Structural Improvements (Including Communications). "-*

(2) As project activities increase, there is a growing need for communications in addition to that provided by the "basic" network. Project funds may be used to the extent that such communication facilities are required primarily for performance of the project work. Examples of such are:

(a) Engineering crews for use on road construction or survey projects.

(b) Brush disposal crews as provided in BD plans.

(c) Cooperative Work Forest Service activities where provision for such purchases is made in the cooperative agreement.

(d) Project crews working in locations where communication facilities are desirable for safety and project program direction.

6522. 57 - Equipment Use, Rentals. Multiappropriation financing and functional distribution of budgeted costs for rentals of equipment should be based on the Fleet Equipment Budget and Financial Plan prepared in accordance with *-FSH 6509. 11c, Fleet Equipment Service Accounting Handbook. -* Payments to the WCF for costs related closely to the ownership of the equipment will be charged to appropriations and functions on a predetermined basis--fixed ownership rate. Charges for operation and maintenance will be on the basis of actual use *-(FSH 6509. 11c). -*

6522. 58 - Construction and Maintenance of Forest Signs. Guidelines for financing the construction and maintenance of National Forest signs are listed on exhibit 1 which follows. Financing for situations not listed therein will be from the benefiting activity. Signs which are an integral part of structures will be financed the same as the structure.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

EXHIBIT F

WO

REPLY TO: 1340 Improvement

May 20, 1971

SUBJECT: Telecommunications Study Data



TO: L. E. Lundberg, Director
Division of Administrative Management

In connection with the Telecommunications Study, we asked the Regional Electronics Officers to provide their best estimate of the financial resources needed to bring the Regional Telecommunications System up to the level planned and approved in current Regional Communications Plans. Regional summaries are attached.

The attached table shows the gross estimates provided by the Regional Engineers and the P&M amounts the Regions received in F.Y. 1971.

The estimates indicate approximately six million dollars is needed to replace telecommunications gear now over ten years in age. (No depreciation fund has ever existed for doing this job.)

Annual replacement (1.8), maintenance (4.0) and construction (0.3) funds estimated to equal 6.1 million dollars, are needed to keep the entire program reasonably current. About 16 percent of the total telecommunication fund expended in Regions 1-6 and 8-9 in F.Y.'s 1969 and 1970 were other than P&M 110 or 111. Therefore, the Regional Electronics Engineers appear to be saying they need about 84 percent times 6.1 or about 5.2 million P&M dollars annually to do what the Line Officers in the field have requested and approved in Regional Communication Plans.

P&M 110 and 111 communication allotments to Regions 1-6 and 8-9 in F.Y. 1971 totaled \$2,363,400 or about 46 percent of the indicated annual need. (These figures do not include any catching up or assessments at the W.O.)

Please note that this estimate also does not include R-10 needs, nor does it consider funds for the development and maintenance of telecommunication nets to cover large fire situations and these must soon be considered.

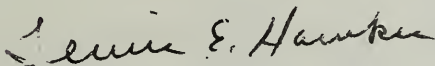
Each Region prepares and maintains a Regional Communications Plan that is reviewed and approved for the Regional Forester by a Regional Communications Committee. In general, these approved plans are quite conservative and field requests are monitored closely. To my knowledge, this is the first rough attempt to put together an estimate of the dollars needed to meet field requests for communications.

I believe the figures well illustrate why there has been and still is a general dissatisfaction with the field telecommunications program and why a demand for a Service-wide study was generated. It also illustrates the unrealistic demands being placed on Regional Electronic Organizations by Line Direction. You can't provide service at a prescribed level with only 46 percent of the needed resources.

The study team is developing a Management System that should first justify and then provide annual estimates of dollar needs. However, such inputs will not be available until F.Y. 1974 or possibly 1975.

I have summarized this information at this time because it may be of some use to you in preparation of the F.Y. 1973 budget requests, and to also give you some advance indication of the degree of financial imbalance that has developed in the Field Telecommunications Program.

Should anyone care to review them in detail, the methods and procedures used to prepare these estimates are on file in the Branch of Management Improvement.



LEWIS E. HAWKES, Chief
Management Improvement Branch

Enclosure

GROSS ESTIMATES PROVIDED BY THE REGIONAL ENGINEERS
AND THE P&M AMOUNTS THE REGIONS RECEIVED IN F.Y. 1971

Item	1	2	3	4	5	6	8	9	Total	F.Y. 1971 Funds /5
<u>/1</u>	1,172,075	585,140	800,000	610,000	1,310,317	500,000	1,212,750	153,000	6,343,282	NONE
<u>/2</u>	195,870	150,000	120,000	301,300	349,600	316,000	315,000	119,582	1,867,352	532,100
<u>/3</u>	433,000	387,370	350,000	643,300	646,835	795,000	645,000	185,000	4,085,505	1,831,300
<u>/4</u>	15,000	30,000	20,000	103,800	56,400	63,000	25,000	10,000	323,200	NONE

/1 Estimated lump sum needed to bring existing nets up to standard as originally planned and approved.
98 This is the existing backlog of needed replacement due to the accumulative reduction in funds over a period of years.

/2 Estimated annual dollars required to keep the replacement program current and assuming that the nets have been updated under /1 above. (Based on 10 year replacement cycle.)

/3 Estimated annual maintenance dollars required to maintain the nets once they are updated as outlined in /1 and /2 above.

/4 Estimated annual construction dollars needed to meet new demands.

/5 Communications P&M 110 and 111 dollars shown in fiscal year 1971 field allotments from W.O. to Regional Offices.

USDA-FOREST SERVICE

Region 1

INVENTORY OF ESTIMATED FINANCING REQUIRED TO BRING THE MAINTENANCE, REPLACEMENT AND CONSTRUCTION OF THE PLANNED REGIONAL TELECOMMUNICATIONS SYSTEMS UP-TO-DATE.

Based on existing Forest and Regional communications plans, please complete the following statements to be used for Service-wide telecommunications budgetary planning for F. Y. 1973.

1. An estimated lump sum of \$1,172,075 would be required to bring the planned replacement of Forest nets, air nets, etc., up-to-date as originally planned.
2. An estimated annual sum of \$195,870 will be required to keep the replacement program current assuming that it is brought up-to-date (Note - Use a ten year replacement cycle for estimating purposes).
3. An estimated annual maintenance budget of \$433,000 will be required to maintain the planned systems once they are updated as outlined in the 1 and 2 above.
4. An estimated annual construction budget of \$15,000 will be required to provide the additional telecommunication services needed. (Note - Base estimates on average annual construction requests received from field in F. Y.'s 69, 70 and 71.)

Note: Include salary for R. O. Electronic Engineer(s) in item 3, and allow for multi-functional assessments of all maintenance, replacement and construction funds at the R. O. level. Complete one form per Region.

Prepared by:

Approved by:

Date

Date

4-2-71

USDA-FOREST SERVICE

Region 2

INVENTORY OF ESTIMATED FINANCING REQUIRED TO BRING THE MAINTENANCE, REPLACEMENT AND CONSTRUCTION OF THE PLANNED REGIONAL TELECOMMUNICATIONS SYSTEMS UP-TO-DATE.

Based on existing Forest and Regional communications plans, please complete the following statements to be used for Service-wide telecommunications budgetary planning for F. Y. 1973.

1. An estimated lump sum of \$585,140 would be required to bring the planned replacement of Forest nets, air nets, etc., up-to-date as originally planned.

2. An estimated annual sum of \$150,000 will be required to keep the replacement program current assuming that it is brought up-to-date (Note - Use a ten year replacement cycle for estimating purposes).

3. An estimated annual maintenance budget of \$387,370 will be required to maintain the planned systems once they are updated as outlined in the 1 and 2 above.

4. An estimated annual construction budget of \$30,000 will be required to provide the additional telecommunication services needed. (Note - Base estimates on average annual construction requests received from field in F. Y.'s 69, 70 and 71.)

Note: Include salary for R. O. Electronic Engineer(s) in item 3, and allow for multi-functional assessments of all maintenance, replacement and construction funds at the R. O. level. Complete one form per Region.

Prepared by:

Donald E. Velasquez

DONALD E. VELASQUEZ, Reg. Elec. Engr.

Date

4/1/71

Approved by:

H. E. Howard

HOWARD LEE, Assistant Regional Forester

Date

4/1/71

USDA-FOREST SERVICE

Region 3

INVENTORY OF ESTIMATED FINANCING REQUIRED TO BRING THE MAINTENANCE, REPLACEMENT AND CONSTRUCTION OF THE PLANNED REGIONAL TELECOMMUNICATIONS SYSTEMS UP-TO-DATE.

Based on existing Forest and Regional communications plans, please complete the following statements to be used for Service-wide telecommunications budgetary planning for F. Y. 1973.

1. An estimated lump sum of \$800,000 would be required to bring the planned replacement of Forest nets, air nets, etc., up-to-date as originally planned.

2. An estimated annual sum of \$120,000 will be required to keep the replacement program current assuming that it is brought up-to-date (Note - Use a ten year replacement cycle for estimating purposes).

3. An estimated annual maintenance budget of \$350,000 will be required to maintain the planned systems once they are updated as outlined in the 1 and 2 above.

4. An estimated annual construction budget of \$20,000 will be required to provide the additional telecommunication services needed. (Note - Base estimates on average annual construction requests received from field in F. Y.'s 69, 70 and 71.)

Note: Include salary for R. O. Electronic Engineer(s) in item 3, and allow for multi-functional assessments of all maintenance, replacement and construction funds at the R. O. level. Complete one form per Region.

Prepared by:

RFB

Approved by:

RFB

Date

Date

3/30/71

USDA-FOREST SERVICE

Region 4

INVENTORY OF ESTIMATED FINANCING REQUIRED TO BRING THE MAINTENANCE, REPLACEMENT AND CONSTRUCTION OF THE PLANNED REGIONAL TELECOMMUNICATIONS SYSTEMS UP-TO-DATE.

Based on existing Forest and Regional communications plans, please complete the following statements to be used for Service-wide telecommunications budgetary planning for F. Y. 1973.

1. An estimated lump sum of \$ 610,000 would be required to bring the planned replacement of Forest nets, air nets, etc., up-to-date as originally planned.
2. An estimated annual sum of \$ 301,300 will be required to keep the replacement program current assuming that it is brought up-to-date (Note - Use a ten year replacement cycle for estimating purposes).
3. An estimated annual maintenance budget of \$ 643,300 will be required to maintain the planned systems once they are updated as outlined in the 1 and 2 above.
4. An estimated annual construction budget of \$ 103,800 will be required to provide the additional telecommunication services needed. (Note - Base estimates on average annual construction requests received from field in F. Y.'s 69, 70 and 71.)

Note: Include salary for R. O. Electronic Engineer(s) in item 3, and allow for multi-functional assessments of all maintenance, replacement and construction funds at the R. O. level. Complete one form per Region.

Prepared by:

James S. Rudd

Date

4/6/71

Approved by:

Lennet E. Lundberg

Date

4/7/71

USDA-FOREST SERVICE

Region 5

INVENTORY OF ESTIMATED FINANCING REQUIRED TO BRING THE MAINTENANCE, REPLACEMENT AND CONSTRUCTION OF THE PLANNED REGIONAL TELECOMMUNICATIONS SYSTEMS UP-TO-DATE.

Based on existing Forest and Regional communications plans, please complete the following statements to be used for Service-wide telecommunications budgetary planning for F. Y. 1973.

1. An estimated lump sum of \$ 1,310,317.⁰⁰ would be required to bring the planned replacement of Forest nets, air nets, etc., up-to-date as originally planned.
2. An estimated annual sum of \$ 349,600.⁰⁰ will be required to keep the replacement program current assuming that it is brought up-to-date (Note - Use a ten year replacement cycle for estimating purposes).
- * 3. An estimated annual maintenance budget of \$ 646,835.⁰⁰ will be required to maintain the planned systems once they are updated as outlined in the 1 and 2 above.
4. An estimated annual construction budget of \$ 56400.⁰⁰ will be required to provide the additional telecommunication services needed. (Note - Base estimates on average annual construction requests received from field in F. Y.'s 69, 70 and 71.)

* Note: Include salary for R. O. Electronic Engineer(s) in item 3, and allow for multi-functional assessments of all maintenance, replacement and construction funds at the R. O. level. Complete one form per Region.

Prepared by:

Approved by:

Date

Date

* Note: R.O. Electronic Engrs. work on many things other than "maintenance" of radio systems. However, as per instructions - the total salaries are included in #3.

USDA-FOREST SERVICE

Region 6

INVENTORY OF ESTIMATED FINANCING REQUIRED TO BRING THE MAINTENANCE, REPLACEMENT AND CONSTRUCTION OF THE PLANNED REGIONAL TELECOMMUNICATIONS SYSTEMS UP-TO-DATE.


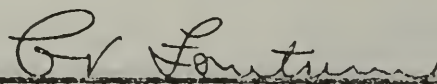
Based on existing Forest and Regional communications plans, please complete the following statements to be used for Service-wide telecommunications budgetary planning for F. Y. 1973.

1. An estimated lump sum of \$500,000 would be required to bring the planned replacement of Forest nets, air nets, etc., up-to-date as originally planned.
2. An estimated annual sum of \$316,000 will be required to keep the replacement program current assuming that it is brought up-to-date (Note - Use a ten year replacement cycle for estimating purposes).
3. An estimated annual maintenance budget of \$795,000 will be required to maintain the planned systems once they are updated as outlined in the 1 and 2 above.
4. An estimated annual construction budget of \$63,000 will be required to provide the additional telecommunication services needed. (Note - Base estimates on average annual construction requests received from field in F. Y.'s 69, 70 and 71.)

Note: Include salary for R. O. Electronic Engineer(s) in item 3, and allow for multi-functional assessments of all maintenance, replacement and construction funds at the R. O. level. Complete one form per Region.

Prepared by:

Approved by:

Date

Date

4/6/71

4/6/71

Region 8

USDA-FOREST SERVICE

INVENTORY OF ESTIMATED FINANCING REQUIRED TO BRING THE MAINTENANCE, REPLACEMENT AND CONSTRUCTION OF THE PLANNED REGIONAL TELECOMMUNICATIONS SYSTEMS UP-TO-DATE.

Based on existing Forest and Regional communications plans, please complete the following statements to be used for Service-wide telecommunications budgetary planning for F. Y. 1973.

1. An estimated lump sum of \$ 1,212,750 would be required to bring the planned replacement of Forest nets, air nets, etc., up-to-date as originally planned.

Includes replacement of equipment 10 years old.

2. An estimated annual sum of \$ 315,000 will be required to keep the replacement program current assuming that it is brought up-to-date (Note - Use a ten year replacement cycle for estimating purposes).

3. An estimated annual maintenance budget of \$ 645,000 will be required to maintain the planned systems once they are updated as outlined in the 1 and 2 above.

4. An estimated annual construction budget of \$ 25,000 will be required to provide the additional telecommunication services needed. (Note - Base estimates on average annual construction requests received from field in F. Y.'s 69, 70 and 71.)

Note: Include salary for R. O. Electronic Engineer(s) in item 3, and allow for multi-functional assessments of all maintenance, replacement and construction funds at the R. O. level. Complete one form per Region.

Prepared by:

R. E. Phillips -
Gaylord A. Kinglet

Date

4/15/71

Approved by:

James A. Carroll

Date

4/15/71

USDA-FOREST SERVICE

Region 9

INVENTORY OF ESTIMATED FINANCING REQUIRED TO BRING THE MAINTENANCE, REPLACEMENT AND CONSTRUCTION OF THE PLANNED REGIONAL TELECOMMUNICATIONS SYSTEMS UP-TO-DATE.

Based on existing Forest and Regional communications plans, please complete the following statements to be used for Service-wide telecommunications budgetary planning for F. Y. 1973.

1. An estimated lump sum of \$153,000 would be required to bring the planned replacement of Forest nets, air nets, etc., up-to-date as originally planned.

2. An estimated annual sum of \$119,582 will be required to keep the replacement program current assuming that it is brought up-to-date (Note - Use a ten year replacement cycle for estimating purposes).

3. An estimated annual maintenance budget of \$185,000 will be required to maintain the planned systems once they are updated as outlined in the 1 and 2 above.

4. An estimated annual construction budget of \$10,000 will be required to provide the additional telecommunication services needed. (Note - Base estimates on average annual construction requests received from field in . Y.'s 69, 70 and 71.)

Note: Include salary for R. O. Electronic Engineer(s) in item 3, and allow for multi-functional assessments of all maintenance, replacement and construction funds at the R. O. level. Complete one form per Region.

Prepared by:

Ronald F. Leavitt
Ronald F. Leavitt

Date

3/29/71

Approved by:

V. A. Parker
V. A. PARKER, Chief, Div. of Operation

Date

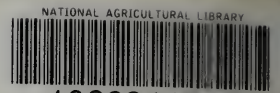
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